Systematic Polysemy

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1 Introduction

Since at least Apresjan (1974), polysemy, i.e. the phenomenon that a word has several distinct but related meanings (see case *Ambiguity*), is divided into two types: *systematic* (or *regular*) *polysemy*, where the same relation holds between the meanings for a series of lexical items, and *non-systematic* (or *irregular*) *polysemy*, where the relation is particular to a single one. More precisely, Apresjan describes the polysemy of a word A with the meanings a_i and a_j as being regular if, in the given language, there exists at least one other word B with the meanings b_i and b_j, which differ from each other in exactly the same way as a_i and a_j, and if a_i and b_i, a_j and b_j are not identical. Often this type of polysemy is so systematic that speakers scarcely notice it. For instance, look at the two occurrences of the lexem *glass* in (1).

(1) (a) John put a glass of wine on the table.
(b) Mary drank a glass of wine.

Due to the different selectional restrictions (see case *Category mistakes and selectional restrictions*) of the verbs it is combined with, the noun varies in its meaning: In (1a), *glass* is used to refer to a container of liquid, while in (1b) it is used to refer to a particular portion of liquid. As amongst others *bottle*, *cup*, *pot*, *jar*, *bucket*, *barrel* and *spoon* can have the same two kinds of meaning, *glass* is to be considered to instantiate systematic polysemy, as are the other items mentioned. Moreover, such an instantiation is not specific to individual languages but usually occurs with the corresponding words in several languages. For example, the same duality of meaning can be observed for *Glas, Flasche*, *Tasse*, *Topf*, *Kanne*, *Eimer*, *Fass* and *Löffel* in German. Crucially, systematic polysemy is determined by the existence of general conceptual patterns connecting distinct word meanings. Accordingly, systematically polysemous words are very common in language. This is specifically true for nouns, which are at the focus of the present chapter.

2 Patterns of Systematic Polysemy

A multitude of patterns underlying systematic polysemy have been distinguished in the literature. Traditionally, they are generally labeled as patterns of meaning alternation, which, as explained in more detail below, is actually not correct. Above all the findings of authors in the 1980s and 1990s laid the foundation for a detailed investigation of them. In what follows, I will give an overview of patterns listed by Apresjan (1974), Nunberg (1979, 1995), Bierwisch (1983, 1989), Pustejovsky (1991, 1995) and others. In addition, I will provisorily characterize the multiple meaning of nouns founded on the respective pattern.

The probably most salient systematic variations in meaning and, with it, in denotation of nouns are closely linked to the count-mass distinction in English and other languages with count-mass syntax (see case *Count vs. mass nouns*; cf. also Pelletier, and Schubert [1989] 2001, Krifka 1995, Chierchia 1998, Falkum 2010, 2011). There are several forms the COUNT/MASS alternation

of a noun can take. First, some nouns vary between a reading in which they denote animals or trees and a reading in which they denote amounts of matter derived from animals and trees, respectively.

a. ANIMAL/FOOD (e.g. *chicken*, *lamb*, *rabbit*, *fish*, *salmon*, *octopus*, *crocodile*)

(2) (a) A chicken pecked the ground.
(b) John ate some chicken for dinner.

b. ANIMAL/FUR (e.g. *rabbit*, *beaver*, *mink*, *ermine*, *cat*, *calf*)

(3) (a) Rabbits grazed on the frish grass.
(b) Mary wore rabbit on the catwalk.

c. TREE/WOOD (e.g. *oak*, *cherry*, *elm*, *chestnut*, *birch*, *pine*)

(4) (a) The oak grew in the garden.
(b) The table is made of oak.

Secondly, nouns such as *beer*, *wine*, *whisky*, *gin* or *coca-cola* can be interpreted as denoting amounts of or portions of liquid, whereby the latter are to be viewed as particular amounts.

d. AMOUNT/PORTION_OF_LIQUID

(5) (a) The superstore sold a lot of beer.
(b) The man bought a beer in the pub.

Thirdly, the meaning of every mass noun alternates between denoting kinds of matter, on the one hand, and amounts of matter which are instances of such a kind, on the other hand.

e. KIND/AMOUNT_OF_MATTER

(6) (a) Three cheeses were served.
(b) There was much cheese on the table.

Beyond that, by analogy, every count noun exhibits a duality of meaning such that it can be used to refer to a particular kind or to an individual instantiating that kind.

f. KIND/INDIVIDUAL

(7) (a) This chair was widespread in the past.
(b) This chair is broken.

The remaining cases of systematic polysemy again have a more specific character. In particular, there exists a pattern according to which the meaning of nouns like *apple*, *pear*, *grapefruit*, *fig* or *cherry* varies between denoting trees, on the one hand, and fruits that originate from them, on the other hand.

g. TREE/FRUIT

(8) (a) The gardener watered the apples.
(b) The girl picked an apple from the tree.

The next pattern, which has been already illustrated by (1), brings about that nouns such as mentioned above can be used to refer to a container or to the amount that container holds.

h. CONTAINER/CONTENT

(9) (a) The man broke the bottle.
(b) The baby finished the bottle.

Beside it, there are several other nouns that in a sense also live on the relationship between container and content. Firstly, nouns like *book*, *dictionary, newspaper*, *map*, *letter*, *film* or *CD* have meanings such that a physical object as well as the information held by it can be referred to.

i. PHYSICAL_OBJECT/INFORMATION

(10) (a) The book is full of coffee stains.
(b) The book turned out to be very uninteresting.

Similarly, the meaning of a noun such as *lecture*, *speech*, *movie*, *play* or *opera* allows to refer to an event and to the information conveyed by it.

j. EVENT/INFORMATION

(11) (a) The lecture took longer than expected.
(b) The student found the lecture boring.

Further, nouns like *bank*, *school*, *university*, *parliament*, *church* or *opera* denote particular social institutions as well as physical objects such institutions reside.

k. INSTITUTION/PHYSICAL_OBJECT

(12) (a) The bank has a good reputation.
(b) The railway station is next to the bank.

Moreover, for instance, *school* and *church* are subject to a meaning alternation based on the fact that the purpose of institutions is to enable processes of a certain type.

l. INSTITUTION/PROCESS

(13) (a) The school hired a new teacher.
(b) School began yesterday at 8.30 a.m.

Another kind of multiple meaning which takes into account the location of social structures is instantiated by nouns like *country* or *city* or proper names like *France* or *Berlin*, which have both an ORGANIZATION meaning and a PLACE meaning.

m. ORGANIZATION/PLACE

(14) (a) The government of the country collapsed on monday.
(b) John travelled to the country last month.

According to the next pattern, nouns like *newspaper*, *journal* or *dictionary* or a proper name like *The Times* can be used to refer to a publisher (i.e. an organization or institution) as well as a publication produced by it.

n. PUBLISHER/PUBLICATION

(15) (a) The newspaper fired its editor.
(b) The newspaper is printed on yellow paper.

In addition, the meaning of many nouns arising from *–ion*-nominalization of verbs (e.g. *solution*, *illustration*, *construction*, *decoration*, *documentation* or *contribution*) alternates between denoting events, on the one hand, and objects resulting from them, on the other hand.

o. EVENT/RESULT_OBJECT

(16) (a) Mary's solution to the problem took 20 minutes.
(b) This solution is too difficult to understand.

By contrast, nouns like *dinner*, *lunch* or *breakfast* have a binary meaning such that they can be used to refer to an amount of food and to the process of consuming it.

p. FOOD/PROCESS

(17) (a) The dinner was prepared in the kitchen.
(b) The dinner today was longer than usual.

Finally, there exist nouns such as *window* or *door* which have both a PHYSICAL_OBJECT meaning and an APERTURE meaning, whereby the relation between them is based on the fact that physical objects of a certain kind can serve to close apertures.

q. PHYSICAL_OBJECT/APERTURE

(18) (a) The workman painted the window green.
(b) The children crawled through the window.

A number of further patterns connecting distinct but related meanings could be added. Instead of that, however, in the next two sections I want to address some data that require to specify our notion of systematic polysemy.

3 Systematic Polysemy versus Metonymy

As also observed by Apresjan (1974), systematic polysemy has a close affinity with *metonymy*, a use of language in which expressions do not have their ordinary, literal meaning (see case *Literal vs. enriched meaning*). Rather, they are used to denote entities that stand in a certain relation to the entities conventionally denoted by them. Consider Nunberg's (1979) famous example in (19), as uttered by one waiter to another in a restaurant.

(19) The ham sandwich is sitting at table 20.

What the sentence is intended to express in the context of use, most probably, is something like 'The person who ordered a ham sandwich is sitting at table 20'. Thus, the DP *the ham sandwich* refers not to a ham sandwich but to a ham sandwich orderer. According to Sag (1981) (see also Nunberg 1995, 2004), the deferred reference is due to the fact that the noun *ham sandwich* is shifted in its meaning from denoting sandwiches to denoting persons who bear the relation of ordering to ham sandwiches. Evidently, the metonymic shift is needed because the DP does not fit to the selectional restrictions of the VP, unless the noun undergoes an adjustment. In more general terms, this kind of sortal coercion serves to prevent a mismatch of meaning between a nominal and a verbal or adjectival expression to be combined (e.g. Partee 1987, Pustejovsky 1991, 1995, Stallard 1993, Nunberg 1995, 2004, Dölling 1995, 1997, Jackendoff 1997, Borschev and Partee 2001, Egg 2005; see also case *Coercion*).

The following sentences show that, unlike systematic polysemy, not only lexical items but also syntactically complex expressions can be subject to metonymy.

(20) The accident was caused by a black BMW.
'The accident was caused by a person driving a black BMW'

(21) The red shirts won the match.
'The people wearing red shirts won the match'

Just as the noun *ham sandwich* in (19), the NPs *black BMW* and *red shirts* are coerced into a reading in which they can be used to refer to human beings. But now the shifts are motivated by the relations of driving between persons and cars and of wearing between persons and clothes, respectively.

Beyond question, systematic polysemy and metonymy are similar to each other in a way. Both involve salient relations between the distinct meanings, which derive from relations holding between elements of the respective domains of denotation. Moreover, like systematic polysemy, metonymic interpretation is governed by a number of underlying patterns (see e.g. Lakoff and Johnson 1980). For instance, what the meaning shifts in (19) – (21) have in common is that they follow the general conceptual pattern OBJECT_USED FOR USER which could be paraphrased as 'Take an expression denoting conventionally objects as standing for persons using them!'. As a consequence, the usual and the metonymic meaning of expressions are likewise systematically related.

Above all for this reason, several researchers (e.g. Lakoff and Johnson 1980, Taylor 1995 and Nunberg 1995) do not always clearly distinguish between systematic polysemy and metonymic interpretation. However, there is a distinctive feature that recommends to keep the two types of systematically related meanings separate from each other. Whereas polysemous lexems have a fixed set of literal (or conventional) meanings, metonymy is a non-literal use of expressions.

Accordingly, with regard to *ham sandwich*, only the FOOD meaning of the noun, but not its USER meaning is encoded in the lexicon. To take three further examples, the same also applies to *rabbit*, *the newspaper* and *Platon*, which are metonymically used in (22) – (24), respectively.

(22) The rabbit was waiting for his check.
  (a) 'The person eating rabbit was waiting for his check'
  (b) 'The person wearing rabbit was waiting for his check'

(23) The newspaper took part at the press conference.
  'One or more persons working for the newspaper took part at the press conference'

(24) The student was reading Platon.
  'The student was reading one or more works written by Platon'

In (22), the noun *rabbit* that literally denotes kinds or instances of animal (pattern f), kinds or amounts of meat (pattern a and e) or kinds or amounts of fur (pattern b and e) is interpreted in such a way that it can be used to refer to a person eating or a person wearing (an amount of) rabbit. Analogously, in (23), the DP *the newspaper*, literally referring to a publishing institution (pattern n), has been shifted into a non-literal meaning in which it denotes one or more persons working for the publisher. Finally, in (24), *Platon* is used to denote one or more works written by the Greek philosopher. As before, it is obvious that the reading generated to match the selection restrictions of the verb is not a literal one and, therefore, not part of the lexical entry of the proper name.

A closer look at the examples given in (1) – (18) above reveals that the instances of systematic polysemy are anything but homogenous. It seems that the nouns carrying multiple meanings can be divided into at least two groups (cf. also Copestake and Briscoe 1995). On the one hand, there are nouns such as *book*, *lecture*, *bank*, *country*, *lunch* or *window*, which have related meanings where we have no substantial reasons for assuming that one or another of them is prior. For instance, neither the PHYSICAL_OBJECT meaning nor the INFORMATION meaning of *book* can be viewed as more basic. On the other hand, there are nouns such as *rabbit*, *oak*, *beer*, *bottle* or *solution*. Here we have clear intuition that, even though each of the meanings the nouns have is literal, one of them is primary. Thus, there is no doubt that, e.g., *rabbit* names a kind of animal, rather than a kind of meat or fur. As a result, the noun has a literal basic meaning referring to the animal and a literal secondary meaning referring to the meat or the fur of that animal. In a similar way, this is also true for the other nouns mentioned, where the TREE meaning, the AMOUNT meaning, the CONTAINER meaning and the EVENT meaning is prior to the WOOD meaning, the PORTION meaning, the CONTENT meaning and the RESULT_OBJECT meaning, respectively.

As apparent from the preceding, the latter group of systematically polysemous nouns seems to be more closely related to metonomy. This can be regarded as an indication that literal secondary meanings ultimately go back to metonymic shifts. For instance, it is conceivable that a noun like *chicken* originally denoted only animals and, if needed, was used metonymically in a FOOD sense. As a result of frequency of use and possibly other factors contributing to the stabilisation of sense, the derived meaning has become conventional and, thereby, has been added to the repertoire of literal meaning. Consequently, as basis for systematic meaning variation of the respective nouns, the ANIMAL FOR FOOD pattern has been replaced by the ANIMAL/FOOD pattern. In a similar way, before its CONTENT meaning has been conventionalized, a noun like *bottle* initially had only a CONTAINER sense and, otherwise, was metonymically interpreted. However, it can not be excluded that analogous considerations also apply to nouns like *book*, *lecture*, *bank*,

country, *lunch* or *window*, i.e. the first group of systematically polysemic nouns. For this reason, we can assume that one or another of their literal senses began its life likewise as result of a meaning shift (see e.g. Eckardt 1999). In any case, it appears that many, if not most, instances of systematic polysemy can be reconstructed diachronically as emerging from metonymy. Thus, with respect to them, using the term *metonymically motivated polysemy* introduced by Apresjan (1974) is appropriate.

Admittedly, it is not always an easy matter to decide whether a noun is used literally or metonymically. In particular, a number of difficulties arise because there are several degrees of conventionalization of a reading. For example, in (25), it is not entirely clear to what extent the proper name *The White House* refers to the President of the U.S. and his administration in a literal or a non-literal sense.

(25) The White House made a wrong decision.

In addition, as pointed out by Nunberg & Zaenen (1992) and Nunberg (1995, 2004), conventionalization varies cross-linguistically. For instance, in Greenlandic Eskimo nouns of animals have no conventionalized FOOD or FUR meaning. Further, German nouns of fruits are not literally used in case they denote corresponding trees. To take another example, unlike French, in English and in German there is no pattern that allows a noun to alternate between a meaning in which it denotes fruits and a meaning in which it denotes amounts of liquid made from them. However, all that does not invalidate the necessity of a strict terminological distinction between systematic polysemy and metonymy.

4 Systematic Polysemy and Co-predication

4.1 Two Types of Systematic Polysemy

In the previous section, I have suggested that systematically polysemous nouns can be divided into at least two groups, namely nouns where the connected meanings are more or less of equal rank and nouns where one of them is basic. As we will see in a moment, the distinction that above has been drawn rather intuitively can be made a little more precise. This possibility derives from the fact that the nouns of the two groups behave differently under co-predication, one of the tests which are traditionally used to distinguish between vagueness and ambiguity (see cases *Vagueness* and *Ambiguity*).

Co-predication occurs when the same nominal expression has simultaneous predications selecting for two different meanings. It is taken as a diagnose of ambiguity with respect to those meanings if it gives rise to *zeugma*, i.e. oddness of meaning resulting from it (Cruse 1986). Many syntactic constructions generate co-predications – relative clauses, and attributive adjectives, for instance – but the classic cases of co-predication are those that involve coordination of verbs or VPs. For illustrating, consider the following sentence in which the verbs *feed* and *eat* are coordinated and applied to the DP *the chicken*:

(26) ??John fed and ate the chicken.
[ANIMAL and FOOD]

As the first conjunct is only applicable to the ANIMAL sense of *chicken* and the second one is only applicable to its FOOD sense, the sentence displays an incompatibility of senses and, therefore, is clearly zeugmatic. Thus, expressing more than one meaning of *chicken* with only one occurrence

of the word is impossible. As noted by Copestake and Briscoe (1995), nouns implementing the ANIMAL/FOOD pattern generally involve a real alternation between both meanings. Obviously, this is likewise true for the instances of each other pattern where the existence of one sense crucially depends on the other, namely the ANIMAL/FUR, TREE/WOOD, AMOUNT/PORTION_OF_LIQUID, TREE/FRUIT, CONTAINER/CONTENT, INSTITUTION/PROCESS or EVENT/ RESULT_OBJECT pattern, for instance. I call this set of cases the *alternating meaning type* of systematic polysemy.

But now look at the sentence in (27) where *pick up* and *master* are used as predicates of physical objects and information, respectively (adapted from Asher and Pustejovsky 2006).

(27) Mary picked up and mastered the book.
[PHYSICAL_OBJECT and INFORMATION]

It appears that the sentence does not exhibit the zeugma that would be expected if *book* was ambiguous in the usual sense. At the same time, we have also no reason to infer that the noun is vague. Rather, it seems that in (27) the DP *the book* simultaneously refers to a physical object and the information contained in it and, therefore, allows co-predication. Accordingly, it looks as thought *book* generally denotes things bringing together the properties of physical object and informational content. This conjecture is also supported by the fact that there are verbs like *read* or *publish* which can only be predicated of entities of such a kind.

(28) (a) Mary was reading the book yesterday.
(b) The book was published by Benjamins.

In order to be read, information has to be physically represented in some way. Conversely, only physical objects that hold information can be read. Similarly, it is not possible to publish something which does not comprise both informational content and some physical manifestation of that content. As a result, the PHYSICAL_OBJECT meaning and the INFORMATION meaning of *book* must not be considered mutually exclusive senses. Instead, they appear to be part of one and the same 'global' meaning the noun has.

Further examples of systematically polysemous nouns of this kind can be taken from literature. Analogous to *the book*, in (29) – (33), the DPs *the door*, *lunch*, *the lecture*, *the bank* and *the city* refer to entities which in each case seem to have a dual nature.

(29) John painted and walked through the door. (Pustejovsky 1995)
[PHYSICAL_OBJECT and APERTURE]

(30) Lunch was delicious but took forever. (Asher and Pustejovsky 2006)
[FOOD and PROCESS]

(31) The lecture (interview, speech) lasted an hour and was very interesting. (Asher 2011)
[EVENT and INFORMATION]

(32) The bank is just around the corner and specializes in sub prime loans. (Asher 2011)
[PHYSICAL_OBJECT and INSTITUTION]

(33) The city has 500 000 inhabitants and outlawed smoking in bars last year. (Asher 2011)
[PLACE and ORGANIZATION]

Generally speaking, none of the nouns following the PHYSICAL_OBJECT/INFORMATION, PHYSICAL_OBJECT/APERTURE, FOOD/PROCESS, EVENT/INFORMATION, INSTITUTION/PHYSICAL_OBJECT or ORGANIZATION/PLACE pattern, for instance, may be treated as inolving an alternation of meaning. Provisionally, I call the set of cases instantiating the patterns concerned the *non-alternating meaning type* of systematic polysemy.

Unfortunately, the results delivered by the co-predication test are not always as clear-cut as it might appear. For this reason, there are a number of cases where the opinions and judgements differ or oscillate. For instance, in view of zeugmaticity of the sentence in (34), Cruse (1986) is inclined to consider *door* a noun alternating between the PHYSICAL_OBJECT meaning and the APERTURE meaning.

(34) ??We took the door off its hinges and then walked through it.

Immediately afterwards, however, he admits that a 'global door' sense is involved in a sentence such as (35).

(35) The door was smashed in so often that it had to be bricked up.

Therefore, Copestake and Briscoe (1995) take acceptable instances of co-predication as evidence that the different senses of a noun are intimitately integrated with one another. But they deny that zeugma is in general explicable by existence of meaning alternation. Thus, co-predication is not a sure diagnostic tool for classifying systematic polysemy. Instead, the authors assume that some sort of pragmatic principle of cohesion must be postulated to account for the oddity of readings where meaning alternation cannot be involved. In a similar manner, Asher (2011) argues that failing the test of co-predication results from different factors. For example, the sentence in (36) as opposed to (33) is rather zeugmatic although both sentences involve the same lexical material but in a different order.

(36) ?The city outlawed smoking in bars last year and has 500 000 inhabitants.

Thus, it appears that co-predication may not only depend on the kind of pattern connecting word meanings but also on the discourse context and the rhetorical connections between the two predications.

4.2 Further Differentiations

To date, we have not taken into account that every common noun can be used to refer to a kind (type) or an instance (token) of this kind (type) (see case *Generics*). As pointed out above, pattern (e) and (f) form the basis for the capability of nouns to denote kinds as well as individuals or amounts of matter. Asher (2011) suggests that constructions such as in (37) and (38) justify to treat the KIND/INDIVIDUAL and the KIND/AMOUNT_OF_MATTER duality as belonging to the non-alternating meaning type of systematic polysemy.

(37) Ducks lay eggs and are common to most of Europe.
[INDIVIDUAL and KIND]

(38) Snow is common this time of year and all over my back yard.
[KIND and AMOUNT_OF_MATTER]

But it might be questioned whether the data are interpreted in a correct way. In the case of (37), it is conceivable that the bare plural DP *ducks* only refers to the kind 'duck' while the VP *lay eggs* is coerced into a reading in which it is predicable of kinds (see Krifka et al. 1995), i.e. the sentence involves no co-predication at all and, in the case of (38), the acceptability of the co-predication is more than uncertain. Indeed, there are no entities that comprise both a kind and one or more of its instances. Therefore, it may be assumed that common nouns in general systematically alternate between KIND meaning and INSTANCE meaning and, thereby, realize the alternating meaning type of systematic polysemy. Whether, as usually assumed, the instance-denoting use of a noun or, as argued for e.g. in Krifka (1995), its kind-referring use is basic or whether rather, unlike the meaning alternations concerned with so far, the various readings of the noun are interdependent in respect of their existence must remain open here.

What seems to be clear, however, is that the ways of referring to kinds are more diverse than made explicit above. In particular, it is essential to bear in mind that most common nouns can also have a reading in which they denote subkinds of the respective kind (see e.g. Krifka 1995, Krifka et al. 1995, Chierchia 1998). For example, this applies to a noun like *chicken*, where more precisely three ANIMAL senses have to be distinguished: a 'chicken-as-kind' reading, as in (39a), a 'chicken-as-subkind' reading, as in (39b), and a 'chicken-as-instance' reading, as in (39c).

(39) (a) The chicken is a widespread cursorial bird.
(b) The Leghorn is a chicken bred in the last century.
(c) This chicken is a freshly slaughtered animal.

In an analogous manner, a distinction between three FOOD senses of *chicken* needs to be drawn. Importantly, under no circumstance a co-predication selecting for two of the different meanings is admissible.

Let us look at a consequence arising from the diversity of KIND meaning for nouns such as *book*. Copestake and Briscoe (1995) note that the oddity of some co-predications cannot be accounted for if the noun is simply treated as holding a PHYSICAL_OBJECT meaning as well as an INFORMATION meaning. Obviously, we have to take into consideration that *book* also alternates between different senses ranging from the unique conceptual work (book-as-work or book type), through a publishing edition (book-as-edition or book subtype) to a concrete exemplar or copy (book-as-copy or book token). As observed by Atunes and Chavez (2003), for example, co-predication relating to the TYPE meaning and the TOKEN meaning of *book* turns out to be inacceptable.

(40) ??This book revolutionized the western world and is full of coffee stains.
[TYPE and TOKEN]

In addition, the authors suggest that the sentence seems more acceptable if the intended reference of *this book* is not a book-as-work but a book-as-copy, although such interpretation is pragmatically harder to put into a plausible context.

(40') ?This book [pointing at a specific copy] revolutionized the western world and is full of coffee stains.

Hence, unlike a book-as-copy, a book-as-work has no physical form and, similarly, a book-as-edition has only an abstract one. It remains to mention that a further kind-referring use of *book* can be found in sentences such as the following:

(41) The book is an important means of knowledge transfer.

Analogous to the generic reference of *ducks*, *snow* and *the chicken* in (37), (38) and (39a), respectively, in (41), the DP *the book* refers to the kind 'book' in its most general sense.

One of the most frequently discussed cases where co-predications at least superficially seem to provide contradictory evidence concerns the polysemic behavior of *newspaper* (see e.g. Copestake and Briscoe 1995, Nunberg 1995, Pustejovsky 1995, Buitelaar 1998, Atunes and Chavez 2003, Asher and Pustejovsky 2006, Falkum 2011, Arapinis 2013). Previously, I have specified two patterns, namely the PHYSICAL_OBJECT/INFORMATION and the PUBLISHER/PUBLICATION pattern, which underlie the systematic meaning variation of the noun. A more detailed analysis shows that the situation is much more complex.

To begin with, like *book*, the noun can denote copies of a newspaper, i.e. concrete objects that have both physical and informational characteristics. Thus, sentences corresponding to (10a) and (10b) are admissible.

(42) (a) The newspaper is full of coffee stains.
(b) The newspaper turned out to be very uninteresting.

As expected, the VP-coordinated sentence in (43) shows that, with respect to its 'newspaper-as-copy' reading, *newspaper* passes the test of co-predication.

(43) The newspaper is full of coffee stains and turned out to be very uninteresting.
[PHYSICAL_OBJECT and INFORMATION]

Further, it appears that the noun, again in analogy to *book*, is also applicable to a newspaper over all of its issues, i.e. a periodical publication, or a singular newspaper issue. In (42b), *newspaper* can occur in each of the two senses while, in (42a), this is not possible or at least highly unlikely. Accordingly, in regard to both readings, the co-predication in (43) seems odd.

Next, sentences like (15a) and (15b) – repeated here as (44a) and (44b), respectively – indicate that *newspaper* can also denote publishers or publications produced by them.

(44) (a) The newspaper fired its editor.
(b) The newspaper is printed on yellow paper.

In contrast to (43), the co-predication in (45), connecting the predications of (44a) and (44b), appears anomalous.

(45) ??The newspaper is printed on yellow paper and fired its editor.
[PUBLICATION and PUBLISHER]

Therefore, one could consider *newspaper* a noun that alternates between the PUBLISHER meaning and the PUBLICATION meaning and, with it, an instance of alternating meaning type of systematic polysemy. But failing the test of co-predication by a sentence like (45) can more likely to be attributed to the fact that the two predications are pragmatically incoherent. In particular,

Copestake and Briscoe (1995) notice that in some cases combining the two senses does seem possible, as in (46).

(46) The newspaper has been attacked by the opposition and publicly burned by demonstrators.
[PUBLISHER and PUBLICATION]

Similarly, Atunes and Chavez (2003) and Asher and Pustejovsky (2006) observe that sentences such as in (47) and (48), respectively, are fully acceptable instances of co-predication.

(47) The newspaper is selling very well in the stands and rising in stock market value.
[PUBLICATION and PUBLISHER]

(48) The newspaper contains some really useful information about restaurants and concerts but publishes a lot of useless junk as well.
[PUBLICATION and PUBLISHER]

Whereas the PUBLISHER meaning relates to particular institutions being likewise exhibited by the meaning of nouns such as *bank*, *school*, *university*, *parliament* or *church* (see e.g. Eckardt 1999 and Arapinis 2013), it is not a priori clear what could be the content of the PUBLICATION meaning of *newspaper*. Accordingly, the opinions on the subject are not unambiguous. For instance, Arapinis (2013) claims that the sentence in (46) points to the possibility of unifying the COPY sense and the PUBLISHER sense of *newspaper* into a single unity. Hence, the PUBLICATION meaning of the noun would have reference to physical objects storing information, which, however, cannot be the case because of the clear anomaly of sentences like (49).

(49) ??The newspaper is printed on yellow paper and is full of coffee stains.
[PUBLICATION and PHYSICAL_OBJECT]

Pustejovsky (1995) likewise remarks that a structured meaning covering the 'newspaper-as-publisher' sense and the 'newspaper-as-copy' sense at least potentially exists while Copestake and Briscoe (1995) and Atunes and Chavez (2003), despite examples like (46), call in question this. In a similar way, Pustejovsky and Asher (2006) are sceptical about the possibility to combine both senses, even though they suppose that co-predications such as in (48) involve the PUBLISHER meaning and the INFORMATION meaning of *newspaper*. All in all, none of the authors mentioned provides a conclusive proposal that is able to capture the facts on co-predication in (46) – (48).

In order to cope with the problem, considering the distinction drawn above between copy, issue and periodical publication plays an essential role. Particularly, it seems plausible to suggest that the PUBLICATION meaning of nouns such as *newspaper*, *magazine* or *journal* is related not to copies and, equally, issues of periodical publication but to the periodicals themselves. Taking as a basis this interpretation, it appears that in a sentence like (50) both predicates apply to periodicals.

(50) The newspaper is printed on yellow paper and published once a week.

Furthermore, co-predications such as in (51) show that the 'newspaper-as-periodical-publication' sense and the 'newspaper-as-publisher' sense of the noun can be immediately combined.

(51) The newspaper is printed on yellow paper and has a young chief executive.
[PUBLICATION and PUBLISHER]

As a consequence, we can assume that, in (51), the DP *the newspaper* refers to an object bringing together the properties of periodical publication and publisher. Obviously, this meaning of *newspaper* also ensures the acceptability of sentences like (46) – (48), albeit on condition that in addition one of the two conjuncts is subject to shifting of meaning. Thus, in (46), the VP *be publicly burned by demonstrators*, being originally only predicable of physical objects, is coerced into a predicate denoting periodicals such that an arbitrary number of their copies (possibly from the same issue or not) considered as representatives of them are publicly burned by demonstrators. Similarly, in (47), the VP *be selling very well in the stands* is shifted to a generic reading according to which copies of the respective periodical are typically sold very well in the stand. Finally, the same is true for the VP *contain some really useful information about restaurants and concerts*, occurring in (48).

It should be noted here that co-predications using relative clauses or attributive adjectives seem generally more flexible. For instance, the sentences in (52a) and (52b), containing in principle the same predications as (45), can be accepted without any problems.

(52) (a) The newspaper that is printed on yellow paper fired its editor.
(b) The newspaper that fired its editor is printed on yellow paper.

Beyond this, the findings often indicate that actually no co-predication is involved. For instance, a sentence such as (53) has, in contrast to its counterpart in (49), an acceptable reading if the subject DP is taken as referring not to a newspaper-as-periodical-publication but to a newspaper-as-copy.

(53) The newspaper that is printed on yellow paper is full of coffee stains.
'The newspaper that is a copy of a periodical printed on yellow paper is full of coffee stains'

Obviously, this interpretation requires that the content of the relative clause is shifted from a predicate applying, amongst others, to publications to a predicate of physical objects. Following a suggestion by Nunberg (1995), such a kind of meaning transfer is pragmatically justified by the fact that the shifted predicate can be used as an effective means for identifying the respective copy.

5 Approaches to Systematic Polysemy

In the last thirty years, a number of competing proposals have been offered in the literature to account, among others, for the data mentioned above. The proposed treatments range from rather informal exploration to more formal analysis. Some approaches view systematic polysemy as primarily a semantic phenomenon and are particularly concerned with representing the different meanings in the lexicon or explicating the lexical mechanisms that generate them. Other approaches treat systematic polysemy as a pragmatic phenomenon and assume that some or all of the concrete meanings are created in context. In what follows, I will roughly distinguish four strategies of how to deal with the lexical representation of systematically polysemous nouns: the meaning enumeration, the primary meaning, the underspecified meaning and the structured meaning strategy. While the first obeys the principle of *lexical polysemy*, which holds that polysemy is explicitly encoded in the lexicon, the others can be regarded as following the

principle of *lexical monosemy* and, thereby, the assumption that for each word, where possible, there is only one lexically stored meaning. As it is not possible to discuss the entire range of proposals in detail here, I will confine myself to some remarks on the basic ideas of the approaches in question. Moreover, I will focus above all on those models that have a substantial influence on current research.

5.1 Meaning Enumeration Approaches

The probably most familar technique of lexical representation is the *meaning enumeration strategy*, according to which all conventional meanings of a word are separately represented in the lexicon. The *classical listing approach*, which is the standard way dictionaries are put together, presupposes that the individual senses are listed either as distinct and entirely independent lexical entries or as distinct subentries distinguished by sense-identification number. Hence, the comprehension of such a noun amounts to a selection of the contextually appropriate meaning from among the list of its lexically represented senses. It is obvious that the listing approach cannot explain the phenomenon concerned with. In particular, Pustejovsky (1995) and Asher (2011) criticize that it fails to capture how the different meanings are related to each other and, therefore, misses the generalization that can be made with regard to the underlying patterns of multiple meaning. As a consequence, the account considered presents instances of systematic polysemy as arbitrary and idiosyncratic features of single lexical items.

This critique, however, is only partially valid for the *network approach* (e.g. Lakoff 1987, Langacker 1988, and Taylor 1995), which also follows the meaning enumeration strategy. According to this model, polysemous nouns are lexically represented as a network of senses centred around a primary, prototypical meaning. Thereby, it is able to account for relations between several meanings of a lexical item. However, a decisive disadvantage is that the approach concentrates on instances of non-systematic polysemy and, thus, has little interest to generalize about classes of systematically polysemous nouns.

5.2 Primary Meaning Approaches

By contrast, the *primary meaning strategy* assumes that only one of the systematically related meanings is lexically represented. More precisely, this meaning is viewed as the primary sense from which the other senses can be derived. For instance, Nunberg (1979) argues that systematically polysemous nouns have only one conventional use, with the other normal uses generated pragmatically. Within his *meaning transfer approach*, Nunberg (1995, 2004) supposes that the basic meaning of nouns such as *chicken* or *oak* is subject to a set of conceptual transfer functions, underlying likewise metonymy. Thus, according to him, it is possible to derive, for example, the MEAT meaning of *chicken* from the ANIMAL meaning of *chicken*, being due to the fact that there is an inherent relation between amounts of meat and animals they originate from. However, the author is not explicit about the lexical representation of the nouns concerned with and the concrete operations their meaning transfer is realized by. Further, as in case of nouns like *book* or *newspaper* it cannot always be said that one of the involved senses is primary and the others are derived, Nunberg (1995) – although not Nunberg 2004 – considers them instances of so-called *dense metonymy*, which means that the meaning transfer is bi-directional (see Cruse 2004 for a critical view). Again, nothing is said about what the lexical representation of such a noun looks like and how its bi-directional transfer can be performed. Generally, as pointed out above, it seems doubtful that an approach that systematic polysemy and metonymy mixes together is on the right track.

Another account pursuing the primary meaning strategy is treating nouns which systematically alternate their meaning as being governed by derivational rules stored in the lexicon. One of the most famous versions of this *lexical rule approach* is the model presented in Copestake and Briscoe (1995). According to it, COUNT/MASS alternations of nouns such as *chicken*, *oak* or *beer* are instances of so-called *sense extension*. More precisely, Copestake and Briscoe assume that there is a set of (semi-productive) lexical rules, in particular several 'grinding' and 'portioning' rules (see case *Count vs. mass nouns*), which are responsible for the derivation of nouns owning a secondary sense. Consequently, it is argued that, e.g., *chicken* is converted by 'animal-meat grinding' from an animal-denoting count noun into a meat-denoting mass noun, and *beer* is converted by 'portioning' from a mass noun denoting amounts of beer into a count noun denoting portions of beer. Such a kind of conversion of nouns from one grammatical category into another seems to be a compelling argument in favour of the rule-based account because the concerning alternations in meaning are in fact always linked to syntactic change. Moreover, derivational rules exhibit blocking. For instance, since the mass noun *beef* already exists, the application of 'animal-meat grinding' to *cow* is normally blocked. Accordingly, the feature of blocking is also considered a hallmark of the approach.

However, there is nothing to prevent us from prefering an account in which the alternating senses of a noun like *chicken*, *oak* or *beer* are considered as being of equal rank. Underlying the idea of lexical conversion from count noun into mass noun and vice versa is the assumption that all common nouns in themselves are syntactically either count or mass (see case *Count vs. mass nouns*). But as noted by several authors (e.g. Pelletier and Schubert [1989] 2001, Krifka 1995, and Chierchia 1998), most, if not all, of them seem to resist such a strict division in the lexicon. Actually, the nouns can be viewed to be lexically underspecified with respect to the mass/count distinction and to be able to take on both a COUNT and a MASS interpretation in context. Thus, as regards English, an indication as to whether a noun is used as having a COUNT or a MASS reading is first given at the level of syntactic construction (see e.g. *a chicken* in (2a) vs. *some chicken* in (2b), *rabbits* in (3a) vs. *rabbit* in (3b) or *a lot of beer* in (5a) vs. *a beer* in (5b) above).

5.3 Underspecified Meaning Approaches

Similar to the primary meaning view, the *underspecified meaning strategy* also supposes that a single lexical meaning forms the basis for the multiple senses an expression has. In opposition to it, however, this meaning is not identical to one of the concrete senses. Instead, the latter are now regarded as being lexically represented in terms of a maximally general, abstract meaning from which all of the distinct readings can be contextually derived.

For the first time, this strategy has been applied to systematically polysemous nouns in Bierwisch (1983) (see also Bierwisch 1989, cf. Lang and Maienborn 2011). On his *two-level approach*, the author postulates two different levels – called *semantic form* and *conceptual structure* – at which the meaning of nouns like *school* or *book* are represented. While the semantic form of a noun is understood as its contextually invariant, underspecified 'core' meaning stored in the lexicon, the representations at the level of conceptual structure stand for the various fully specified senses the noun can have in context. The distinction Bierwisch suggests is based on his general assumption that the actual interpretation of an expression is not so much determined by its linguistic meaning, as rather by conceptual knowledge about the entities which are subject of the utterance containing the expression. For instance, he assumes that there is a certain amount of encyclopedic world knowlegde which specifies that a school is primarily a particular kind of institution hosted by a building and associated with processes that aim at the education of pupils (cf. Arapinis 2013). In accordance with it, *school* is connected with a family

of four systematically related concepts – 'school-as-institution', 'school-as-building', 'school-as-process', and 'school-as-kind-of-institution' – which act as the readings of the noun occurring in sentences such as (54a) – (54d), respectively.

(54) (a) The school made a major donation.
(b) The school has a flat roof.
(c) He enjoys school very much.
(d) School is one of the pillars of our civilization.

With respect to its lexical entry, however, Bierwisch proposes that all occurrences of *school* share one semantic form, which looks approximately like the λ term in (55).

(55) λx. PURPOSE(x, W), with W = TEACHING_AND_LEARNING

It appears that this underspecified meaning structure displays only that *school* is denoting entities which have the purpose of education. By contrast, the interpretations coherent with the context in sentences like (54a) – (54d) are generated through an operation labeled *conceptual shift.* In particular, the following schemata provided by the system of conceptual knowledge serve to transform the semantic form of the noun into the distinct readings.

(56) (a) λPλx. INSTITUTION(x) ∧ P(x)
(b) λPλx. BUILDING(x) ∧ P(x)
(c) λPλx. PROCESS(x) ∧ P(x)
(d) λPλx. KIND_OF_INSTITUTION(x) ∧ P(x)

Applying the conceptual schema in (56a) to the semantic form in (55), we get the conceptual structure of the occurrence of *school* in (54a):

(57) λx. INSTITUTION(x) ∧ PURPOSE(x, W)

The fully specified senses of the noun for the other sentences can be created in the same fashion. In view of the fact that a number of lexical items permit similar variations in meaning, it can be reasonably assumed that nouns like *bank*, *parliament* or *church* have the same semantic form as *school*, with the difference that now the symbol W has another content. Under this condition, the semantic form of the nouns can be likewise subject to conceptual shifts by use of the schemata in (56a) – (56d). However, since e.g. *church* but not *bank* or *parliament* possesses a PROCESS meaning, the schema in (56c) may only applied to the semantic form of nouns of the first kind. Thus, to an extent, the account allows for a generalization about systematic meaning variation displayed by the nouns under discussion.

In the literature it has been noted that the approach suffers from certain shortcomings (e.g. Taylor 1995, Blutner 2002, and Lang and Maienborn 2011). First of all, it does not deliver a more detailed definition of the mapping operations assumed to apply between semantic form and conceptual structure. In particular, it is not sufficiently clear how linguistic and non-linguistic information is integrated in the process of conceptual interpretation. Moreover, the proposal does not involve reliable principles to find the 'core' meaning of a systematically polysemous noun as well as to constraint the range of contextually specified meanings associated with it.

In order to overcome some of these problems, Dölling (1997) (see Dölling 1995 for an earlier proposal) argues for a view which can be called *parameter-fixing approach*. According to it, the semantic form of nouns under discussion does not encode a 'core' meaning with denotation at all but, rather, something much more abstract and schematic. More precisely, it is regarded as a radically underspecified structure containing certain parameters (or free variables) which have to be fixed (or saturated) by assignment of suitable values in the course of contextual interpretation. For instance, considering the occurrence of *newspaper* in sentences like (58a) – (58c), Dölling supposes that the noun has a ‚newspaper-as-physical-object', a ‚newspaper-as-information' and a ‚newspaper-as-institution' reading.

(58) (a) The newspaper was on the table.
(b) The newspaper was censored yesterday.
(c) The newspaper was founded three years ago.

On this basis, his suggestion is that the semantic form of *newspaper* looks like the λ term in (59), whereby $\underline{K}$ and $\underline{newspaper}$ are parameters that have, among others, the possible values INSTANCE (for the relation ‚instance of') and $\text{newspaper}_{\text{INST}}$ (for the kind ‚newspaper-as-institution'), respectively.

(59) $\lambda x.\ x\ \underline{K}\ \underline{newspaper}$

Accordingly, if $\underline{K}$ and $\underline{newspaper}$ are replaced by the values mentioned above we get a parameter-fixed structure which represents the contextually specified meaning the noun in (58c) has.

(60) $\lambda x.\ x$ INSTANCE $\text{newspaper}_{\text{INST}}$

As indicated in (60), this occurrence of *newspaper* denotes instances of the kind 'newspaper-as-institution' or, shorter, newspapers-as-institution. In a similar way, namely by replacing of $\underline{newspaper}$ by $\text{newspaper}_{\text{PHYS\_OBJ}}$ (for the kind ‚newspaper-as-physical-object') or $\text{newspaper}_{\text{INFO}}$ (for the kind ‚newspaper-as-information') the parameter-fixed structure of *newspaper* in (58a) and in (58b), respectively, is created. Furthermore, Dölling's approach includes a proposal on how such structures can be systematically derived by taking recourse to world knowledge. Following the idea that grasping the full meaning of an utterance always requires some kind of pragmatic enrichment, the assumption is that fixing of parameters is carried out in terms of inferences adopted by Hobbs, Stickel, Appelt, and Martin (1993) in their abductive interpretation model (cf. Maienborn 2003 for a similar view).

Semantic underspecification, in conjunction with a pragmatic mechanism of contextual specification, seems to be a promising strategy to handle nouns like *chicken*, *oak* or *beer*, which display systematic alternation in meaning. However, underspecified meaning approaches are not able to provide an adequate explanation of data such as those mentioned above with respect to co-predication. In particular, the accounts proposed by Bierwisch (1983) and Dölling (1997) do not sufficiently take into consideration that some of the different readings of a noun can be more closely interconneted than others. For example, as observed previously, the INSTITUTION meaning and the PHYSICAL_OBJECT meaning of *school* seem to be so intimately related to each other that they must not be viewed as alternative senses. Accordingly, assuming that the noun has two separate meanings which allow to refer to a school-as-institution and a school-as-building, respectively, seems inappropriate. The same is true for *newspaper* in regard to its supposed

referring to newspapers-as-information, on the one hand, and newspapers-as-physical-object, on the other hand. As a consequence, the approaches under consideration miss to account for the non-alternating meaning type of systematic polysemy.

5.4 Structured Meaning Approaches

The *structured meaning strategy* is especially intended to capture the behavior that nouns such as *book*, *school* or *window* exhibit in constructions involving co-predication. According to it, for instance, *school* has a single lexical meaning that is structured in such a way that the noun is able to denote entities being at the same time a physical object as well as an institution. Cruse (1986) is probably the first work taking into account the specificity of this kind of systematically polysemous nouns. The *facet approach* argued for e.g. in Cruse (1995, 2004) treats the two (or more) word senses as different facets of a unified ‚global' concept, which at the same time does not preclude that the single facets behave independently in some contexts. Thus, unlike the accounts dealt with previously, the differences in the various readings are not described by saying that the entities a noun denotes can be sorted in more than one way. However, Cruse's proposal on the lexical representation of the regarding nouns as well as on the mechanism for selecting one of the possible facets appears to be too vague and indeterminate to give the foundation for a conclusive analysis. Thus, its influence on current research is rather relatively low.

In contrast, until today the most influential implementation of the structured meaning strategy is the account offered within the generative lexicon theory (Pustejovsky 1991, 1995). In pursuing the general idea of a lexicon that includes entries being typically much more complex than is usually assumed and certain rules for generating contextualized meanings on the basis of the entries, Pustejovsky (1995) suggests that nouns like *book* or *window* have a structured meaning that allows them to denote so-called *dot objects* – these are objects that exhibit various aspects related to one another in a particular way. More precisely, Pustejovsky's *dot-type approach* supposes that on the basis of a significantly richer system of semantic types the nouns are associated with a *dot type*, i.e. a complex type with two (or more) constituent types (see e.g. Pustejovsky 1998 for details). These constituent types correspond to the different aspects of the respective objects and, thus, license predications over either of the two dot-element types. Crucially, the contextual restriction of the dot type to one of its constituent types is analyzed as a phenomenon of lexically driven type coercion (see cases *Type shifting* and *Coercion*).

For example, as *book* originally denotes objects displaying a physical as well as an informational aspect, the base type of a definite DP with the noun as nominal head is the dot type PHYSICAL_OBJECT • INFORMATION and, with it, a type consisting of the simple type PHYSICAL_OBJECT and the simple type INFORMATION. In particular, for the reason that the verb *read* selects for an object argument having both physical and informational characteristics, in (61), the DP *the book* is of the dot type.

(61) Mary was reading the book yesterday.
[PHYSICAL_OBJECT • INFORMATION]

Pustejovsky supposes that in contrast to this the lexical meaning of *book* has to be restricted to a PHYSICAL_OBJECT reading in (62a), and to an INFORMATION reading in (62b), because a VP such as *is full of coffee stains* demands a physical object as its argument, and a VP such as *turned out to be very uninteresting* demands an informational content.

(62) (a) The book is full of coffee stains.

(b) The book turned out to be very uninteresting.

Accordingly, a coercion is assumed to transform the type PHYSICAL_OBJECT • INFORMATION into the type PHYSICAL_OBJECT in (62a), and into the type INFORMATION in (62b). The same as mentioned for *book* is true for nouns such as *school*, *lecture*, *city*, *dinner* or *window*. Thus, for instance, the DPs *the school*, *the lecture*, *the city*, *the dinner* and *the window* receive the type INSTITUTION • PHYSICAL_OBJECT, EVENT • INFORMATION, ORGANIZATION • PLACE, EVENT • FOOD and PHYSICAL_OBJECT • APERTURE, respectively.

But what about instances where multiple predicates are applied to a dot-type expression, and each of the predicates selects for a specific constituent type? Pustejovsky argues that one of the key properties of dot types is that they make co-predication possible. Actually, as a sentence such as in (63) contains a coordination of the VPs *is full of coffee stains* and *turned out to be very uninteresting*, the predicates need simultaneous access to the two constituents of the type PHYSICAL_OBJECT • INFORMATION.

(63) The book is full of coffee stains and turned out to be very uninteresting.
[PHYSICAL_OBJECT and INFORMATION]

Thus, following the general proposal, it would be necessary to assume that, at the same time, the first VP coerces *the book* to be of type PHYSICAL_OBJECT, and the second one coerces it to be of type INFORMATION. Since the type requirement of one of the coordinated VPs can be satisfied, but not the requirements of both, however, there is no possibility to travel this way. Hence, although Pustejovsky's assumption of dot types makes a decisive contribution to the explanation of the phenomenon under discussion, we must conclude that like the previous models his analysis cannot explain the co-predication data.

Note that there are still other problems with Pustejovsky's account. First of all, it appears that the scope of application of the dot-type view is extended too far. Particularly, Rumshisky, Grinberg, and Pustejovsky (2007) (see also Pustejovsky and Ježek 2008 and Ježek and Melloni 2010) assume that, for instance, *chicken*, *oak*, *apple*, *bottle* and *solution* are associated with the type ANIMAL • FOOD, TREE • WOOD, TREE • FRUIT, CONTAINER • CONTENT and EVENT • RESULT_OBJECT, respectively. This assumption, however, is contrary to the observation made above that the concerning nouns do not allow co-predication. Further, Pustejovsky (1995) provides for a noun like *newspaper* a lexical entry which contains a dot type combining the simple type ORGANIZATION and the dot type PHYSICAL_OBJECT • INFORMATION. Nevertheless, the author concedes that only the ORGANIZATION reading or the PHYSICAL_OBJECT • INFORMATION reading is available. Thus, while the noun is associated with the complex dot type ORGANIZATION • (PHYSICAL_OBJECT • INFORMATION), it does not allow to refer to an object corresponding to this type. Generally, a number of mechanisms suggested by Pustejovsky are not spelled out in detail or prove formally inadequate and, therefore, call for some clarification (see Asher 2011 for a critical view).

A more sophisticated version of the dot-type approach is delivered in Asher and Pustejovsky (2006) and, particularly, in Asher (2011). Taking seriously the idea of type-driven meaning composition, Asher argues for an account in which predicates place differentiated type presuppositions on their arguments and, thereby, provide the base for a complex mechanism of type checking. Further, he suggests that predication can involve type adjustments at logical form to make the predication succeed when an argument does not satisfy the type presupposition. The effect of these adjustments is that the logical form will contain material that is not present in the λ

terms for the constituent words themselves (cf. e.g. Dölling 1995, 1997 and Egg 2005 for proposals being similar in a certain sense).

Put in highly simplified terms, the following picture with respect to a dual aspect noun such as *book* and its behavior during the process of composition emerges: The lexical-semantic entry for the noun looks like the λ term in (64), where x: P • I (P for PHYSICAL_OBJECT and I for INFORMATION) is an assignment of the type P • I to the objectual variable x.

(64) $\lambda x\text{: P} \bullet \text{I}.\ \text{book}(x)$

Just like Pustejovsky, Asher takes the position that in general dot-type arguments should be adjusted to match the type requirements imposed by verbal predicates selecting for one of the constituent types. More specifically, he assumes that to resolve the type mismatch in a sentence like (62a), we need to apply to the λ term in (64) the functor in (65) that shifts a predicate of type ⟨P • I, T⟩ (T for TRUTH_VALUE) to a predicate of type ⟨P, T⟩.

(65) $\lambda P\text{: } \langle \text{P} \bullet \text{I, T} \rangle\ \lambda x\text{: P}.\ \exists y\text{: P} \bullet \text{I}\ [P(y) \wedge \text{ASPECT}(x, y)]$

As a result, the λ term in (66) indicates that in the given context *book* is not a predicate of P • I objects but a predicate of physical objects being an aspect of books.

(66) $\lambda x\text{: P}.\ \exists y\text{: P} \bullet \text{I}\ [\text{book}(y) \wedge \text{ASPECT}(x, y)]$

Similarly, to satisfy the type requirement imposed by a verbal predicate like such in (62b), we need to apply the functor in (67) that again takes a predicate of type ⟨P • I, T⟩, but now returns a predicate of type ⟨I, T⟩.

(67) $\lambda P\text{: } \langle \text{P} \bullet \text{I, T} \rangle\ \lambda x\text{: I}.\ \exists y\text{: P} \bullet \text{I}\ [P(y) \wedge \text{ASPECT}(x, y)]$

Accordingly, we get the λ term in (68) which makes it clear that in this case the noun *book* is a predicate being applicable to the informational aspect of books.

(68) $\lambda x\text{: I}.\ \exists y\text{: P} \bullet \text{I}\ [\text{book}(y) \wedge \text{ASPECT}(x, y)]$

Let us now return to a co-predication example such as in (63). As pointed out above, the problem here is that we have two incompatible type requirements that both have to be satisfied by the same dot-type argument. In the face of this, Asher brings to mind that we have to ensure that predicates are of the same type when they are conjoined. Therefore, in opposition to Pustejovsky and by exception to the general rule, he assumes that in cases of co-predication the types of the predicates have to be adapted to the dot types of their arguments. Thus, instead of shifting the logical form of the dual aspect noun, in (63) we need to apply the functors in (69) and in (70) to transform the first VP from a predicate of P objects and the second VP from a predicate of I objects, respectively, into a predicate of P • I objects.

(69) $\lambda P\text{: } \langle \text{P, T} \rangle\ \lambda x\text{: P} \bullet \text{I}.\ \exists y\text{: P}\ [P(y) \wedge \text{ASPECT}(y, x)]$

(70) $\lambda P\text{: } \langle \text{I, T} \rangle\ \lambda x\text{: P} \bullet \text{I}.\ \exists y\text{: I}\ [P(y) \wedge \text{ASPECT}(y, x)]$

Generalizing from these examples, Asher concludes that there are two cases of type adjustment particular to dot types: one where we require a functor that takes us from a predicate of objects of a dot type to a predicate of objects of one of its constituent types and one where we require a functor that takes us in the other direction. As is demonstrated by the structures in (65) and (67), on the one hand, and in (69) and (70), on the other hand, both kinds of functors follow a specific pattern.

Without any doubt, Asher has developed the most detailed semantic theory presently available providing for a formal analysis of the non-alternating type of systematic polysemy. However, his approach also raises some questions. In particular, while he delivers a convincing account of co-predication and, thus, can escape one of the main challenges that Pustejovsky's model faces, it is not immediately clear why Asher argues that in cases like (62a) or (62b) the dot-type argument has to be adapted to the type of the verbal predicate. As the example in (71) illustrates, this can give rise to difficulties when the DP in question serves as an anaphoric antecedent.

(71) The book is full of coffee stains. In addition, it turned out to be very uninteresting.

Once we retype *the book* from P • I to P, there seems to be no possibility of recovering the dot type for the DP, which would be necessary, however, if we want to ensure that the anaphor *it* and its antecedent are coreferent. Obviously, this problem receives no solution unless the noun *book* preserves its type in composition. For this reason, it could be useful to assume that adaptation always takes place towards the dot type.

6 Conclusion

Research starting from Apresjan 's original characterization has made a number of essential contributions in highlighting the variety of ways in which nouns can be systematically polysemous. In particular, it has been found necessary to distinguish between two basic types of phenomena which are usually considered as falling under the notion of systematic polysemy. While nouns instantiating the first type have several separate meanings that alternate dependent on the context, nouns belonging to the second one displays only one meaning which, however, is related to distinct aspects of the objects denoted by the respective noun. Obviously, the latter type differs from the traditional understanding to such an extent that one might wonder whether applying the term *polysemy* to it is really appropriate. Irrespective of this, there is also the problem of how nouns that instantiate both types should be lexically represented. It is conceivable that for accounting them the underspecified meaning strategy has to be taken as an overall framework within which the dot-type approach can be pursued. Finally, it should be mentioned that until now empirical studies focussing on systematic polysemy are relatively few in number and have yielded conflicting results (cf. e.g. Frisson 2009, Foraker and Murphy 2012, Klepousniotou, Pike, Steinhauer and Gracco 2012 and Frisson 2014). Thus, to what extent experimental research can help to come to a decision between the different theoretical approaches remains to be seen.

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