Lexikalische Semantik
52.150 Proseminar Di, 14-16, MOS, 403, Manfred Krifka

Das Proseminar führt in verschiedene Aspekte der lexikalischen Semantik andhand des Englischen, Deutschen und anderer Sprachen ein. Im einzelnen werden wir uns beschäftigen mit: (1) Strukturelle Beziehungen zwischen Wortbedeutungen, z.B. taxonomische Hierarchien, semantische Felder; (2) Prototypen und Vagheit; (3) Polysemie und systematische Bedeutungsveränderungen; (4) Konnotationen und lexikalische Präsuppositionen; (5) Wortarten: Nomina und Adjektive; (6) Verbklassen und Verbalternationen; (7) Bedeutungsveränderungen. Voraussetzungen sind Grundkurskenntnisse in Syntax und Semantik.

Leistungsnachweis:

(a) Hausaufgaben

(b) eine Kurzpräsentation eines Papiers während des Semesters, mit ausführlichem Handout
    oder eine Seminararbeit zu einem vorher abgesprochenen Thema
    (kritische Diskussion eines Artikels oder eigenständiger Forschungsbeitrag).

Koordinaten:

    Büro: Schützenstr. 21, Zimmer 415, Telefon: 20196-670
    Sekretariat: Barbara Leubner, Telefon 20196-639, Zimmer 424
    e-mail: krifka@rz.hu-berlin.de (bitte als Betreff [*Subject*]: "Lex-Seminar")
    Sprechstunde: Mittwoch 13 – 15 Uhr und n. Vereinb (bitte im Sekretariat anmelden)
    Website des Kurses siehe unter: http://amor.rz.hu-berlin.de/~h2816i3x/lehrstuhl

1. Introduction

1.1 The Lexicon in Linguistic Theory

The notion of the "lexicon" has gained tremendous importance in modern linguistic theory, both in syntax and semantics.

In classical transformational grammar and in later versions of generative grammar, such as Government and Binding theory, the lexicon specified the necessary basis for syntactic rules. The lexicon was seen as a set of words together with a specification of their syntactic categories and (in the case of predicates) their subcategorization frame, as in the following example:

(1)   *put*: V, [_NP, _PP[+Loc]]

This says that *put* is a verb that expects an object NP and a locative PP (the subject NP remains unspecified, as every English verb needs a subject). This lexical entry then allows for the formation of sentences like *Mary put the book on the shelf*, according to syntactic rules.

Different versions of generative grammar differ in the way how syntactic rules and lexical entries interact. In classical generative grammar, the output of syntactic rules "looks for" lexical entries of particular type; in lexicalist approaches such as Lexical Functional Grammar or Head-Driven Phrase Structure Grammar, lexical entries enable particular syntactic structures. But not much is said about why, for example, *put* has the category and subcategorization frame that we assume.

Quite similar in classical formal semantics. The meaning of simple expressions is assumed to be given, and the main interest is in the rules that allow to derive the meaning of complex expressions.

Both generative syntax and formal semantics had ways to deal with lexical regularities. We find for example lexical redundancy rules in syntax. For example, the alternation between *Mary handed the letter to John* and *Mary handed John the letter* can be expressed by the following redundancy rule:

(2)   Any verb that is subcategorized for [_NP _*to* NP]
       is also subcategorized for [_NP _NP].

But such a rule is too general, as we will see, and more adequate formulations will have to refer to the meanings of the verbs involved.

In formal semantics, a popular way of dealing with lexical regularities are MEANING POSTULATES. For example, the transitive use and the intransitive use of *eat* can be related to each other by the following meaning postulate:

(3)   Only such interpretations will be considered for which it necessarily holds:
       The sentence "x ate" is true iff there is some y, and "x ate y" is true.

One would like to see general motivations for such meaning postulates.

In a sense, both generative grammar and formal semantics treat the lexicon as a "repository of all of a language's idiosyncrasies" ([Williams, 1994 #6743]). But it is evident that the entries of a mental lexicon are governed by rules that can be explained. Theories about the lexicon should specify reasons why, for example, *hand* and *eat* occur in the two patterns indicated.

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1.1 Lexicon vs Encyclopedia

Often a difference is made between the purely linguistic properties of words and other knowledge. For example, the English word *nurse* does not have any gender, but English speakers will typically understand it as referring to a female nurse, due to extra-linguistic knowledge.

The term LEXICON is typically reserved for the linguistic aspects of words and word meaning, whereas ENCYCLOPEDIA is used for other aspects that include world knowledge.

2. Lexical Relations

In this section we will introduce a number of notions that have been used to describe the meaning relations of lexical items with respect to each other. See Lyons (1977) ch. 9, Cruse (1986): ch. 12 for further discussion.

2.1 Basic Relations

2.1.1 Synonymy

Two expressions , of a language are called SYNONYMS iff they mean the same. This notion is typically applied to lexical items, including idioms, but it can be used for larger expressions as well, of course.

There are few true synonyms. The reason is obvious: a true synonym of an expression would be superfluous; its communicative niche is already occupied, as it were, and it wouldn't be economical of a language to entertain it.

The best candidates for synonyms, like *woodchuck* and *groundhog*, exist because they were coined in different subgroups of a speech community, but are known to the larger community. So they represent dialectal or idiolectal differences.

Most cases that are considered synonyms have identical or similar truth conditions, but differ in other respects, such as stylistic level (e.g. *baby, infant, neonate*, or *fiddle* and *violin*, or *pass away, die, kick the bucket*), or the general field of discourse (e.g. *marriage, matrimony* (legal), *wedlock* (church)), or certain connotations (e.g. *police officer* and *cop, cleaning lady* and *maid*).

Near-synonyms are actually more interesting for linguistic purposes than occasional true synonyms. Take the near-synonyms *kill, murder, assassinate* and *execute*; they show crucial meaning differences in their selectional restrictions and other features.

Synonymous expressions can in general be substituted for each other without change of the truth conditions of the larger constructions in which they are used (a condition called *replacement salva veritate*). This is typically used as a defining criterion for synonyms (e.g., Cruse 1986 p. 88):

(4) A lexical expression   is a synonym of a lexical expression   iff every declarative sentence [… …] that contains   has the same truth conditions as [… …], the sentence where   is replaced by .

This definition has to be refined in one respect, as it applies to specific uses. For example, *police* and *cops* should probably be near-synonyms, but notice that *police* also occurs as a verb, whereas *cop* doesn't.

This is a workable definition because it concentrates on the truth-conditional aspect. Using "   " for mutual entailment, we have for example:

(5) Bill watched a woodchuck   Bill watched a groundhog.

However, synonyms may differ in linguistic features such as gender. For example, in German *Briefmarke* and *Postwertzeichen* are as good candidates for synonyms as any, but the first is feminine, and the second neuter, which means that substitution may lead to ungrammaticality (*die Briefmarke, das Postwertzeichen, *das Briefmarke*).

> Exercise: Take three synonym pairs (if you want, from a dictionary or a dictionary or a thesaurus) and describe their differences.

2.1.2 Hyponymy

An expression   is a HYPONYM (i.e. an "undername") of an expression   iff everything that falls under   also falls under . In this case,   is called a HYPERONYM (i.e. an "overname"). Examples are *dog* and *mammal*, *apple* and *fruit*, *refrigerator* and *appliance*, *king* and *monarch*, *scarlet* and *red*, *walk* and *go*.

It is not easy to give operational tests for hyponyms. One might think about the following:

(6) A lexical expression   is a hyponym of a lexical expression   iff every declarative sentence [… …] that contains   entails the sentence [… …], the sentence where   is replaced by   (but is not entailed by it).

The condition in parentheses gives a "strong" notion of hyponymy, one that excludes synonymy. We also say that [… …] UNILATERALLY ENTAILS [… …]. I will use "   " for the entailment relation, and | for the unilateral entailment relation.

It is clear how the condition is supposed to work. However, it does not give us the right result. Consider the following example:

(7) a. John ate an apple. | John ate a fruit.
      b. John didn't eat a fruit. | John didn't eat an apple. (!)

The reason is that negation reverses implication relations. It creates a so-called "downward entailing" context. There are quite a few other expressions that create downward-entailing contexts, e.g. the restrictor of the quantifier *every* and the

(8) a. Every kid that ate a fruit will get a dessert. | Every kid that ate an apple will get a dessert.
      b. Mary left without taking a fruit. | Mary left without taking an apple.

Hence we must make sure that the hyponym we want to test does not occur within a downward-entailing context. (A relatively good sign for such contexts in English are contexts in which one could use so-called NEGATIVE POLARITY ITEMS like *any* or *ever*). But there are other cases in which the criterion for hyponymy does not hold: If there are two fruits around, one of them an apple, the sentence *John ate the apple* does not entail *John ate the fruit* or *John ate the fruits*. The sentence *Mary likes apples* does not entail *Mary likes fruits* (apples might be the only fruits Mary likes!). And so on. There is no operational definition for hyponyms.

2.1.3 Complementaries and antonyms

If two expressions , cannot apply to the same entity or phenomenon, they are called INCOMPATIBLE. There are many reasons for incompatibility, and only some are of linguistic interest.

One type of incompatibility is represented by COMPLEMENTARY terms. These are pairs like *open* vs. *closed*, *alive* vs. *dead*, *true* vs. *false*. Anything that can fall under these terms at all either falls under one or the other. That is, anything that meets the presuppositions of the terms. Doors, windows, gates and other kinds of openings meet the presuppositions of *open* and *closed*, and they are either one or the other.

Another type of incompatibility that is of particular linguistic interest is ANTONYMY. Most examples are adjective pairs, like *cheap / expensive*, *short / tall*, *light / dark*, *dumb / clever*, *fast/ slow*, but we also find pairs of verbs, like *rise / fall*. In contrast to complementary terms, it might be that a particular instance neither falls under one nor the other. For example, a certain book may be neiuther cheap nor expensive. Adjectives that come in antonym pairs are typically gradable, they have comparative forms (e.g. *cheaper*) and superlative forms (e.g. *cheapest*).

Antonyms denote qualities that can be ordered along certain dimensions, e.g. price, height, speed, intelligence, one term denoting the high end, the other the low end, with a possible region in between. For some types of phenomena we find more than just two terms, e.g. for temperature *cold, cool, warm, hot*.

See Cruse 1986: chapter 9 for further discussion; we will come back to the semantics of adjectives.

> Have a look at a thesaurus (such as Roget's thesaurus online, http://www.thesaurus.com/). Which types of lexical relations do you typically find within one entry?

2.1.4 Markedness

It is a frequent situation that one expression can serve as its own hyponym (so-called AUTOHYPONYMS). We often find this with names of biological kinds, when gender is a factor. For example, *dog* is a term for dogs in general, but can also be used for male dogs and is then contrasted with *bitch*. The noun *cow* is used for female cattle, but also for cattle in general,[1] whereas *bull* is used for mail cattle only.

In structuralist terms, *dog* and *cow* are UNMARKED, and *bitch* and *bull* are MARKED. The marked or unmarked status sometimes is reflected in morphological complexity; cf. *lion* as the unmarked expression and *lioness* as the marked expression.

The autohyponym is often the expression that denotes the thing or concept that is considered more typical or more frequent.

Markedness distinctions also appear with antonym pairs. For example, with the pair *short / tall*, the unmarked member is *tall*. This expression is used in expressions like *how tall is he?*

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[1] Historically it has developed from a noun for cattle to a more restricted sense, female cattle.

or *he is 4'5" tall*, which do not imply that the adjective *tall* in its absolute sense can be applied at all.

1.2 Taxonomies

2.1.5 Introduction

Taxonomies are sets of expressions (or concepts named by expressions) that stand in a particular hyponym relation to each other, which we call the SUBKIND relation. There are no clear operational criteria for this special type of hyponymy relation either, but the following is a relatively coherent test:

(9) An expression stands in a subkind relation to an expression iff " is a kind/type of " is a true sentence.

Some examples and non-examples:

(10) A schnauzer is a type of dog.
A banana is a type of fruit.
A refrigerator is a kind of (kitchen) appliance.
A desk is a type of furniture.
A violin is a musical instrument.

(11) ? A bitch is a kind of dog.
? A kitten is a type of cat.
? An actress is a kind of woman.

We don't see bitches (female dogs) as a subspecies of dogs, even though *bitch* is a hyponym of dog. The gender differentiation is irrelevant for the subkind relation; it rather applies to many other terms that denote biological kinds, often with specialized terms (e.g., *cow*, *mare*, *sow, hen …*).

The subkind relation is not transitive. For example, we can consider schnauzers as a kind of dog, dogs as a kind of canine, and canines as a kind of mammal, and mammals as a kind of animals. But it is somewhat inappropriate to consider a schnauzer as a kind of animal, or a kind of mammal.

(12) ?? A schnauzer is a kind of animal.

Cf. Cruse 1986: chapter 6 for further discussion.

English nouns often have two interpretations, one that applies to the objects belonging to a kind, and one that applies to subkinds:
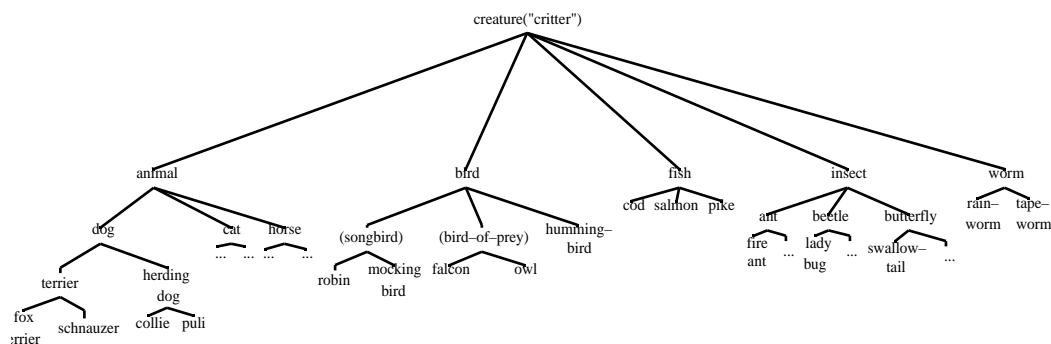
(13) a. This (pointing to Fido) is a dog.
b. The Chihuahua is a dog.

Krifka, et al. (1995) call this the "taxonomic" intepretation of nouns. Nouns in this interpretation are always count nouns, even if they are regularly mass nouns:

(14) The Camembert is a cheese.

2.1.6 Taxonomic Hierarchies

Taxonomies can be depicted as tree diagrams (technically, Hasse diagrams based on the subkind relation). The following is a very incomplete, and partly debatable, diagram of a typical naive understanding of English terms for animals.

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(15)

creature("critter")

animal · bird · fish · insect · worm

animal: dog · cat · horse ... ...
bird: (songbird) · (bird–of–prey) · humming–bird
fish: cod · salmon · pike
insect: ant · beetle · butterfly
worm: rain–worm · tape–worm

dog: terrier · herding dog
(songbird): robin · mocking bird
(bird–of–prey): falcon · owl
ant: fire ant ...
beetle: lady bug ...
butterfly: swallow–tail ...

terrier: fox terrier · schnauzer
herding dog: collie · puli

See Kay (1971) and Kay (1975) for a discussion of the mathematical structure of such trees.

2.1.7 Folk Taxonomies

Taxonomic hierarchies have been studied intensively by anthropologists and linguists because they seem to indicate how humans and cultures classify the phenomena around them. There can be important differences between different cultures, or between classifications done in particular cultures and scientific classifications, in particular of biological kinds. Such hierarchies are called FOLK TAXONOMIES.

A classic study in this field is Berlin, Breedlove, & Raven (1973), who have investigated folk taxonomies in various cultures (in particular, Tzeltal Maya), and who claimed that folk taxonomies of different cultures are structurally similar. Cf. also Brown (1984), Berlin (1992) for more recent overviews of biological classification. Folk taxonomies typically have the following properties:

Their depth is limited, the maximum is about 5 to 6 nodes (compare to classification in biology with depths of more than 20 nodes). The five nodes are named as follows: UNIQUE BEGINNER (e.g., *creature*), LIFE-FORM (e.g., *animal*[2]), a possible node INTERMEDIATE (e.g., *carnivore*), GENERIC (e.g., *dog*), SPECIFIC (e.g., *terrier*), VARIETAL (e.g., *fox terrier*).

The generic level is of particular interest (Rosch e.a. call this the BASIC LEVEL). Words of this level are typically used to name objects when presented with a specimen, they are the first ones learned by children, they are recognized most rapidly. These words are particularly frequent, and therefore often shorter and morphologically simpler than words on other levels. The generic level has the most members (in the magnitude of 500 for plants and a similar number for animals for many societies, cf. Berlin 1992: 96ff.).

There are isolated branches or UNAFFILIATED GENERA, that is, not every genus node is related to an intermediate or life-from (Berlin 1992: 171ff.). These are typically forms that differ considerably in their appeearence or are important because they are cultivated.

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[2] In English folk taxonomy, *animal* often means, roughly, *mammal*, and is contrasted with *bird*, *insect*, *worm* etc.

There are COVERT categories, that is, nodes that are recognized but don't have a name (also called LEXICAL GAPS). Such covert categories show up with questions like "does X have any relatives?". (For me, the node that combines apples and pears is covert; for oranges, tangerines, lemons etc. I have *citrus fruit*). Another example: verbs of locomotion in English; there appears to be no general term for locomotion on land (vs. general terms for locomotion in water, *swim*, and in air, *fly*), but of course this node has subnodes like *run*, *walk*, *crawl* etc.

Life forms are often relatively stable across cultures. For example, plants are often grouped in woods, vines, and grasses/herbs. However, different cultures may group things quite differently. The following classification is reported for the node that contains most vertebrates in Rofaifo (New Guinea, Dwyer 1984, cited in Berlin 1992):

(16) a. *hefa* eel, cassowary, larger species of monotremes (anteaters), marsupials, and rodents, pigs, dogs and other introduced mammals

   b. *hunembe* smaller species of marsupials and rodents

   c. *nema* bats and birds (except cassowaries)

   d. *hoiaifa* lizards, snakes, fish other than eels, molluscs, earthworms, leeches, flatworms, centipedes, millipedes

   e. *hera* frogs (except frogs of three specific genera)

Taxons that are lower than the genus level are often morphologically complex.

There is a certain tendency that nouns denoting higher nodes are mass terms, presumably as higher nodes are considered more abstract, and abstract nouns are often mass. Examples (cf. Cruse 1986) are *cutlery* (with lower nodes *knife, spoon, fork*), or *woodwind* (with lower nodes *bassoon, oboe, flute*).

The subnodes of one supernode are typically mutually exclusive (incompatible). For example, apples, pears, bananas are all considered subkinds of fruit, but nothing that's an apple is a pear or a banana.

Different speakers within a community may entertain slightly different taxonomic hierarchies, and the structure of hierarchies may change over time. One example is the plant hierarchy. While morphological evidence points towards classifying *tree* as life-form and *elm, birch, oak* etc. as generic, urban Americans take *tree* to be the generic term and have the other terms as specific (cf. Coley, Medin, & Atran (1997) for a comparison of the folk-biological taxonomies of Maya villagers and American undergraduates; Tanaka & Taylor (1991) for tests involving dog and bird experts).

Different subkinds of a kind may be considered more or less PROTOTYPICAL for a kind. For example, *robin* is considered more prototypical for *bird* than *ostrich* or *penguin*. Prototypical examples are the ones that are named more easily and whose properties are considered more typical for the kind. We will turn to the issue of prototypes later.

Expressions may be part of more than one taxonomic hierarchy. For example, *dog* features both in the hierarchies of animals and in the hierarchy of pets.

2.1.8 Natural Kinds

What is the motivation for categorization, and for the specific type of categorization that we find in taxonomies?

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An obvious reason is that categorizing an entity or a group x of enties as belonging to category Y allows a person to draw certain inferences about the properties and the behavior of x, if these properties and behaviors are known to be typical for category Y.

The taxons on the genus level, which are the most developed, presumably allow for a maximum of inferences. For example, even though dogs differ a lot from each other, there are many properties that they share and in which they contrast to cats. This is especially important for learning. On being told that a particularly strange creature is a new breed of dog, I immediately know which properties and which behavior I should expect.

There is evidence that there is an instinctive need to structure phenomena in taxonomic hierarchies, with the members of each taxon sharing essential properties. This often goes against superficial visual similarity. Young children assume that members of the same taxon have non-obvious things in common. They think that non-visible internal parts are particularly important for the behavior of an entity, and that these properties stay constant even under superficial changes Keil (1989), Gelman, Coley, & Gottfried (1994). This has been called **cognitive essentialism**, and the categories that are supposed to be defined by such essential properties are called **natural kinds** (see Schwartz (1977), a discussion of natural kinds in philosophy).

Construct a list of fifteen (diversified) insect names (including *bedbug*, *ladybug*, *cockroach*, *caterpillar*, *moth*, *butterfly*, *dragonfly*, *bee*, *ant*), construct a list of ten names of small animals that are not insects (including *spider*, *centipede, millipede, crab, gecko*),
put both lists together and randomize,
and ask three native speakers of English whether the named creatures are *bugs.*
Try to explain your findings. What makes a bug a bug?

1.3 Meronomies

The term MERONOMY (sometimes PARTONOMY) is used for structured parts of the lexicon that denote prominent parts of entities. A typical example are body parts:

(17)
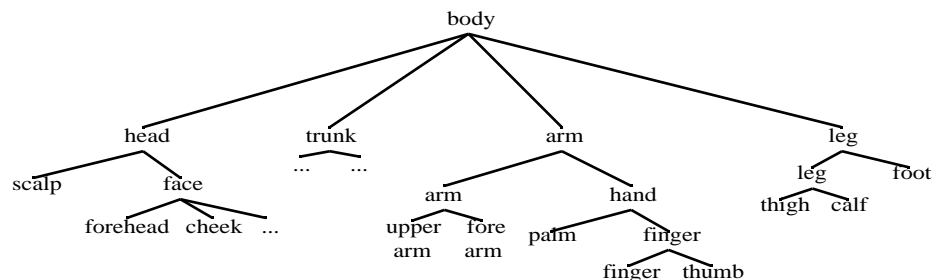
Relatively good tests for meronymical relationships are the following frames:

(18) a. An ___ has a ___ .
     b. A ___ is a part of an ___ .

See Cruse 1986: ch. 7 for futher discussion of meronomies, and Winston, Chaffin, & Hermann (1987).

In the mereology in (17) we see several cases in which a node and a daughter node carry the same expression. For example, *arm* can denote an arm including a hand, or the part that contrasts with the hand. Typically, we find special terms for more prominent parts. In the case of *finger* / *thumb* we have a regular markedness relation, *thumb* being the marked element.

As with taxonomies, merologies of the same entity can differ between speech communities. For obvious reasons this can be studied particularly well for body parts; cf. Brown (1976), Andersen (1978). Andersen observes that body-part meronymies rarely exceed five levels, and never six.

Mögliche Seminararbeiten oder Präsentationen:

1. Tanaka & Taylor 1991. (Exploration of the notion of basic level / genus with respect to different expertise levels; discusses experiments of Rosch to establish that level.)

2. Coley e.a. 1997. (basic level terms and inferences for Maya villagers and American undergraduates).

3. Andersen 1978. (Universals of body part terminology)

4. Review of literature pertaining to the assumption that there is a relation between social complexity (e.g., agriculturalists vs. hunter/gatherers) and the emergence of lexical differentiation. This hypothesis was put forward by Brown & Witkowski (Brown & Witkowski (1981; Brown (1984)) and criticized by Dimmendaal (1989); see also literature cited there and Berlin (1992).

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