

1 Some preliminaries: What is Semantics?

1.1 What is Semantics? Some definitions.

If not most, at least, many introductions to semantics begin by asking the following question: *what is semantics?* What does semantics actually study? This seems like a sensible way to start a course on semantics, so we can begin by looking at some of the answers that different authors provide.

| | |
|--|---------------------------|
| <i>Semantics is the study of meaning</i> | Lyons (1977) |
| <i>Semantics is the study of meaning in language</i> | Hurford & Heasley 1983 |
| <i>Semantics is the study of meaning communicated through language</i> | Saeed (1997) |
| <i>Semantics is the part of linguistics that is concerned with meaning</i> | Löbner (2002) |
| <i>Linguistic semantics is the study of literal, decontextualized, grammatical meaning</i> | Frawley (1992) |
| <i>Linguistic semantics is the study of how languages organize and express meanings</i> | Kreidler (1998) |

Table 1.1. Some definitions of semantics

Table 1.1. provides a selection of definitions. Something that can be noticed is that there is no complete agreement. For some, semantics concerns the study of meaning as communicated through language, while for some others, semantics studies *all* aspects of meaning and they have to add the label “linguistic” to arrive at a more precise definition. This distinction, however, is not generally given much importance and leaving aside special formulations, probably all authors would agree with Kreidler’s definition (to choose just one of them): ***linguistic semantics is the study of how languages organize and express meanings.***

This, however, leaves us with a second question: what do we understand by “meaning”? What is that “meaning” that is organized and expressed by languages? In very general terms, speaking consists of communicating information: somebody (the speaker) has something in his/her mind (an idea, a feeling, an intention, whatnot), and decides to communicate it linguistically. Vocal noises are then emitted that are heard by a second person (the hearer), who “translates” these noises back into ideas, with the result being that this hearer somehow “knows” what the first person had in mind. That “something” that was at first in the speaker’s mind and now is also in the hearer’s mind is what we call meaning. What can it be? The

problem is that it can be virtually anything: objects (concrete, abstract or imaginary), events and states (past, present, future or hypothetical), all sort of properties of objects, feelings, emotions, intentions, locations, etc. We can talk about anything we can think of (or perhaps almost). And if we were to arrive at a rough idea of what meaning is, we would nevertheless have another list of questions waiting in line. These are some of them, in no particular order:

- How exact is the “copy” of the meaning that goes “from” the speaker “into” the hearer? That is, how faithful or precise is linguistic communication?
- How can the meaning of a given word or expression be defined or measured?
- Are there different types of meaning?
- What is the relationship between language and thought? Do we think *in* language or a similar format?
- Can language express all meanings or are there meanings that cannot be expressed linguistically? If you cannot express something in your language, can you think about it?
- Which are the laws governing the changes of meaning that words undergo through time?
- Should semantics study *all* aspects of the meaning of a word, or only those that are important or necessary for linguistic processing? (i.e. should we distinguish semantics and pragmatics, and if so, where do we draw the line?)
- Do different languages structure and express meaning in significant different ways?
- How do children learn the meaning of words?

And perhaps the most crucial question for linguists:

- What parts of the linguistic code correspond to what parts of meaning?

These are some of the questions that semantics has to try to answer; along the history of semantics, different theories have chosen to focus on some of them and have ignored the rest, and have also provided radically different answers to some of these questions. The **history of Semantics** is not straightforward. In a way, semantic studies can be traced back to the first studies of language by man. Since the very first moments in which man started to investigate the phenomenon of linguistic communication, semantics had a central place in that endeavor. Thus Aristotle’s first ruminations on language (IV c. BC) or Pāṇini’s grammar (IV c BC?), included as part of their program questions about meaning in language. Such questions have continued to be present in most linguistic discussions up until our century.

The attempt to find the correspondence between parts of the linguistic code and parts of meaning can be considered the goal of any linguistic theory in general. However, there have been many disagreements on how to approach this question. Even the overall importance of the study of meaning in a linguistic theory is still approached very differently by different linguistic theories. In the century or so of existence of linguistics as an autonomous discipline, semantics has been awarded different degrees of importance or centrality in linguistic analysis. For example, Semantics was banned from linguistics by American structuralism (e.g. Bloomfield); it was not something “observable”, and therefore, it should not form part of any scientific study of language. And probably, the most successful linguistic theory of the XXth century, Chomskyan generativism, also decided that semantics was not a central part of linguistic analysis. In their view, the central concern of language is syntax: linguistic knowledge is basically knowledge about syntax. This is the information that is “pre-wired” in children’s brains, in the Language Acquisition Device. The connection between words and phrases and their meanings is something that is achieved by “general purpose devices”, that is, psychological mechanisms that are not specifically linguistic in nature, and thus, fall outside the scope of linguistic study. In their opinion, you can study language, and you can explain a significant part of its behavior, if not everything, just by looking at syntax, at the rules for the different combinations of words. The meanings of words and expressions do not have to be included to capture the true essence of linguistic behaviour.

So, during most of XXth c. semantics was banned from linguistic studies (specially in American circles), first by Bloomfieldian structuralism and then by Chomskyan generativism. By the end of the century, however, some scholars started to rebel against this state of affairs, in the belief that that theoretical stance was incorrect and artificial. Since 1980’s, we start to find more and more opinions which are completely different.

Langacker, for example, speaks about the “centrality of meaning to virtually all linguistic concerns” (Langacker 1987:12). In his view:

Meaning is what language is all about; the analyst who ignores it to concentrate solely on matters of form severely impoverishes the natural and necessary subject matter of the discipline and ultimately distorts the character of the phenomena described (Langacker 1987:12)

A similar view is expressed by the artificial intelligence scholar, Robert Wilensky:

The notion of meaning is central to theories of language. However, there appears to be considerable disagreement regarding what a theory of meaning should do, and how it pertains to other linguistic issues (Wilensky, 1991).

Nowadays, there are two ways of approaching semantics. The **formal semantics** approach connects with classical philosophical semantics, that is, logic. It should not be forgotten that semantics was a part of philosophy for many centuries. Formal semantics tries to describe the meaning of language using the descriptive apparatus of formal logic. The goal is to describe natural language in a *formal*, precise, unambiguous way. Related (though not identical) denominations for this type of semantics are *truth-conditional* semantics, *model-theoretic* semantics, *logical* semantics, etc. In *truth-conditional* semantics, the goal is to describe the conditions that would have to be met for a sentence to be true. To understand “*It is raining*”, you have to know which conditions must obtain in the world for this sentence to be true. Formal semantics is concerned with how words are related to objects in the world and how combinations of words preserve or not the truth-conditions of their components. Formal semantics follows **Frege’s principle of compositionality**: the meaning of the whole is a function of the meaning of the parts. Thus, syntax is clearly very important to this type of analyses; in fact, this approach connects with Chomskyan linguistics, in which syntax is actually the driving force in language. This type of semantics has proposed very precise and detailed analyses of sentences and propositions, though at the price of abandoning many of the factors affecting meaning, such as etymological, cultural or psychological considerations, and neglecting a detailed analysis of the meaning of words (lexical semantics).

The other approach to semantics we could call psychologically-oriented semantics or **cognitive semantics**. This approach does not consider the logical structure of language as important for the description of the meaning of language, and tends to disregard notions such as truth-values or strict compositionality. Cognitive semantics tries to explain semantic phenomena by appealing to biological, psychological and even cultural issues. They are less concerned with notions of reference and try to propose explanations that will fit with everything that we know about cognition, including perception and the role of the body in the structuring of meaning structures. This is the approach that we will follow in this course, and we will see some of their tenets and proposals with some detail.

While the study of other linguistic levels can prove undoubtedly difficult, the study of meaning can offer difficulties which can seem insurmountable. *Phonology* studies phenomena which are quite concrete and tangible: the linguistic sounds produced by humans. These sounds can be recorded with several methods (sometimes, very sophisticated), the organs involved in their production can be investigated, or the acoustic composition of the sound wave, the combinations of sounds allowed in each language, how context affects their production or interpretation, etc. In the same way, *morphology* and *syntax* also have an object of study which is concrete: *morphology* studies the different parts of words and their order of combination, while *syntax* studies the order in which words are placed when formulating a message and the different structures that can be formed when different words are grouped together (i.e. phrases). In both cases, we can observe

the object of study in a direct way: recording conversations, looking at texts that have been produced in different ways (written form, oral form), etc.

But the object of study of semantics is much more slippery, more elusive: the goal is to analyze the “meaning” that linguistic elements express. This is a much harder problem, which will always lead to the core of the nature of meaning. These are questions that men has been asking since the beginning of times, and it is not completely clear that we have arrived at a satisfactory answer.

In spite of these difficulties, semantics must be awarded the central place in the process of linguistic research. Throughout the years, only two plausible functions of language have been considered: a communicative function and a representational function; in both of them, semantics has to be placed at the very heart of the process. If language evolved as a means of communication and this is its real and original function and *raison d’être*, then we find meaning at the beginning and at the end of the communication process, and must be considered therefore as a central part of the nature of language itself. On the other hand, some scholars have proposed that the real *raison d’être* of language is not communication but mental representation (i.e., language is a way of re-presenting the world in our minds). This would offer humans the advantages of performing certain manipulations of those representations, allowing us to conceive hypothetical scenarios, complex reasoning patterns, conditionals, etc. In this case, we again find meaning in the central place: the function of language is to represent reality in our minds, and that is what meaning is all about.

To get a grasp of the difficulties involved, let us try to think for a moment about one specific concept: that of “coffee”. Can we provide a precise answer to the question “What is the meaning of coffee?” Is it the mental information that we have about the concept and that is evoked by the sounds /kɒfi/? How much do we know about “coffee”? In the next page, you have a list of facts that we know about coffee

.SOME FACTS WE KNOW ABOUT COFFEE

We know that coffee is a drink, made of some plant beans, that is black, has a particular smell, a strong taste, that we put sugar in it, that it has a particular effect (stimulating), that can be taken hot or cold, that we can take it in other forms (ice-cream, cakes), we know how to prepare coffee in different ways, the devices you use to prepare coffee (the normal household coffee-pot, the professional cafeteria espresso-maker, the filter-version, etc.), the recipients where you put the coffee when it's done (a cup, a jug, etc.), when you take coffee or how many times a day (at breakfast and after lunch are the most typical, and then, mid-morning coffee, probably; sometimes after dinner, but only when you go out), the varieties of forms in drinks (in Spain, *solo*, *cortado*, *bombón*, *con leche*, *manchado*, *largo*, *corto*, *americano*, *belmonte*, *asiático*, *carajillo*, *irlandés*, apart from *granizados* and *blanco y negro* to give the most popular list), you know how expensive it is (depending on whether you buy it in a shop, in a café, in a hotel, in an airport, etc.), where they sell it, which companies sell it (Nescafé, Marcilla, Bonka, Saimaza (you might remember Juan Valdés), the varieties in shops (in Spain we have *mezcla*, *torrefacto*, and *natural*, and then “normal” or decaffeinated, for machine or instantaneous); you know it's produced in countries like Brazil and Colombia, the type of shops where they sell coffee so you can prepare it yourself (supermarkets) or the beverage ready to be drunk (cafés), you know the difference between a café and a cafeteria (like a University), you know the social occasions in which coffee is the typical drink (think of the expression “go out for some coffee”, which implies that you will talk, possibly about informal or personal matters, in Spain, this is the occasion to make social relations; another typical situation is in exam preparation), you know that too much is bad for your health, that smokers feel compelled to smoke when they drink coffee, that you must store it in a dry and fresh place, that in planes the option is either tea or coffee, how you take coffee in a plane (you're supposed to put the cup on a tray), that the substance which coffee has that makes you nervous is called caffeine, that other related beverages with caffeine are colas, that “lovers” of coffee take it black and with no sugar, other national varieties of coffees such as English-American, Turkish-Greek, Italian-Espresso, that stains from coffee are difficult to clean, that there is a “coffee” hour, or a “coffee break” during which you stop your work and have a coffee (or even something else: you can have “tea” at a coffee-break), that Spanish civil-servants have the reputation of taking very long coffee breaks, etc.

This list probably could go on almost indefinitely. We could have more “personal” information, things that belong to the private sphere (in my case, I associate coffee with my childhood, because of the coffee pudding that my mother used to make me), or the associations that the song by Juan Luis Guerra “Ojalá que llueva café” could have for someone.

Then we would have highly contextual information, like the fact that, coffee being a liquid, it can be used to put out a fire (a very small one, that's true), etc., etc.

Which part of this knowledge is to be accounted by a theory of linguistic semantics? Can we divide the line between the dictionary and the encyclopedia? Is it all the information we have about concepts relevant for language or only a subset of

it? The questions are many, and many of them will prove exceedingly difficult. But all journeys, no matter how long, start with the first step.

1.2 How can meaning be communicated?

“A buen entendedor, pocas palabras bastan” (Spanish saying)

In our definition, we have been careful to add that “semantics is the study of meaning *in language*”. The reason is that language is not the only way in which we can communicate meaning. We can do it, for example, just by showing people our hands:



Almost everybody in our Western culture knows the meaning that these “signs” have (approximately, disapproval, victory (or peace), approval, question and greeting). There are lots of “symbols” that are used to communicate meaning: all the traffic signs are an example. If you want to communicate that something is dangerous, you can attach to it this sign:



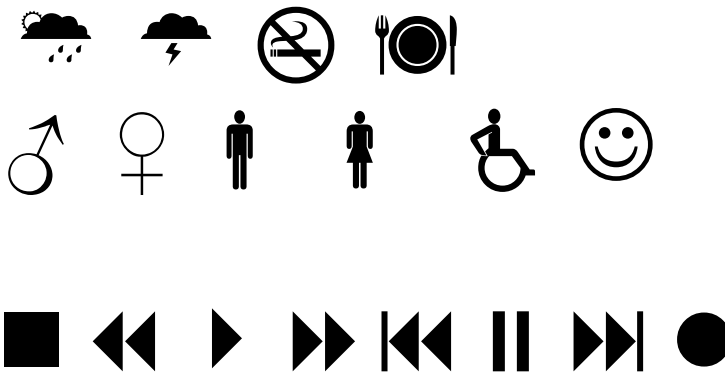
The study of meaning in general is done by **semiotics**. Semiotics studies how “signs” mean, that is, how we can make one thing stand for another (a “signifier” stands for a “signified”). For example, in Western culture, black clothes are used to indicate mourning, and in our beaches, a red flag means that it’s dangerous to swim. It is clear that all these signs are culturally-based: for example, in some Eastern cultures, the color to indicate mourning is white.

Normally, semioticians find it useful to make a three-way distinction, first established by C.S. Pierce:

1. **Icon:** a relation of similarity between the sign and what it represents; for example, a portrait, etc.
2. **Index:** a cause-effect relationship; contiguity in space or time; for example, smoke and fire, yawning and boredom, vultures circling overhead a dead animal
3. **Symbol:** an arbitrary, conventional relationship between sign and meaning; for example, red flag and danger.

Clearly, linguistic meaning will be mainly circumscribed to the third type. Therefore, semantics must be seen as a sub-part of semiotics, and this is how most scholars regard language. Very often we find cases in which a sign is at the same time, icon, index and symbol, they are built upon each other: symbols on indices and indices on icons.

⊗ Are the following icons, indices or symbols?



⊗ Think of non-linguistic symbols in our culture

⊗ Try to find five examples of icon, index and symbol

1.3 How is meaning communicated through language?

“Everything in language conspires to convey meaning” (Wierzbicka, 1988)

The main question that semantics then has to ask is: how is meaning communicated linguistically? What resources has language to convey or express meaning? We can try to revise the different levels one by one and see what type of meaning can be expressed.

1.3.1 Phonology

Can we express meaning by uttering isolated sounds? Do linguistic sounds have meaning by themselves? At first sight, the answer is no. The phoneme /l/ or the phoneme /o/ have no meaning by themselves. However, this immediate answer can be reconsidered and modified slightly if we take a look at what has been called “sound symbolism”.

SOUND SYMBOLISM

- Sound symbolism states that there is a certain association between the sound of an utterance and its meaning. Other definitions could be “a non-arbitrary connection between sound and meaning” or “words that sound like what they mean”. For example:

A) sillín vs sillón

The sound /i/ tends to be associated with small things. Most diminutives are formed with this sound in many different languages.

| DIMINUTIVE AFFIXES IN SEVERAL LANGUAGES | | | |
|---|-----------|----------------|-----------|
| -(t)je | (Dutch) | -ling, -ie, -y | (English) |
| -ino | (Italian) | -cik | (Turkish) |
| -ito/a | (Spanish) | ki- | (Swahili) |
| -chik | (Russian) | | |

The reason for this, it seems, lies in the way in which this sound is produced. To utter the phoneme /i/, we have to raise the tongue and leave a very small space in our mouth; the contrast between this sound and /o/ is evident. That is why /i/ sounds tend to be associated with small things, and /o/ sounds with big things.

| /I/ VS /O/ SOUNDS | |
|-------------------|-----------|
| a bit | a lot |
| teeny | humongous |
| squeak | roar |
| tweeters | woofers |
| sillín | sillón |

B) maluma vs takete

Gestalt psychologists (Kohler, 1297/1949) thought of a very interesting experiment. They gave people two different forms; one of them was spiky and with angles, and the other round and soft. They told subjects that one of them was called “takete” and the other one “maluma”.

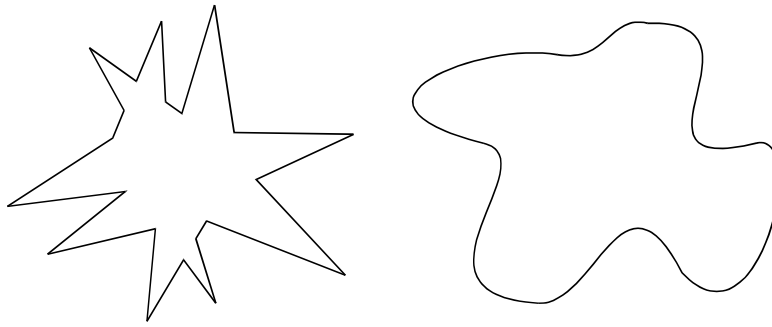


Figure 1.1. Which is “maluma” and “which takete”?

Interestingly, a vast majority of people tended to associate the name “maluma” with the round, soft figure and the name “takete” with the spiky one. This experiment was initially carried out in Germany during the 40’s, but it has been replicated both in America and in Tanganyika, essentially with the same result.

C) meow, plunge and swim

Another example of a certain relationship between sound and meaning is to be found in phenomena such as **onomatopoeia** (roughly, the linguistic mimicking of non-linguistic sounds, such as the barking of a dog *bow-wow*), **phonesthesia** (when the sound of the word reminds us of the action or object they describe as in *plunge*, *whisper*, *crack* or *frizzle*) and **phonesthemes** (an association of certain phonemes with certain meaning, in a rather random way, as *st-* for verbs indicating movement, as in *stomp*, *stampede*, *step*, *stride*, *stroll*).

Having said all this, however, it seems that it’s not very clear that we can predict a certain meaning from a given sound. In all these cases, all we can find is a certain association of sounds with some shades of meaning, but never a well-defined, crisp and concrete meaning. To find meaning proper, we have to enter the next level of language: the lexicon and more specifically, morphology.

1.3.2 Morphology

Morphology refers to word structure. Words are the “carriers” of meaning *par excellence*. To indicate meaning we use words. However, if we look at the internal structure of words, we see that the different parts of words indicate different types of meaning. Morphemes may be lexical or grammatical and the latter may be inflectional or derivational; each type of morpheme is used to convey a different type of meaning.

Let us begin with grammatical morphemes; they are usually divided into **inflectional** morphemes (which do not change the grammatical category of the stem; e.g., the plural), and **derivational** morphemes (used to change the grammatical category of the stem; e.g., -er of “worker”). In English, we find that the meaning that are associated with *inflectional* morphemes are rather limited in number.

1.3.2.1 SOME INFLECTIONAL MEANINGS

-Plurality: if we want to indicate that there is more than one element of the thing we are referring to, we attach a specific morpheme: -s. So, *cats* indicates that there are more than one *cat* in our scene. Of course, there are other ways to indicate plurality in English; we have umlaut (*man~men*), invariant forms (*sheep~sheep*), etc.

-Possession: we can indicate who the possessor of an element is by attaching another morpheme: 's (e.g., *John's hat*.)

-Gender: in some English nouns, specially those referring to animals or human professions, we can distinguish male from female by attaching a special morpheme, indicating that the sex is female: *waitress*, *actress*, etc. Sometimes, this is indicated by a totally different word (*king-queen*, *bull-cow*, *boy-girl*), or it cannot be indicated at all by morpheme or change of word (*doctor*, *engineer*, *eagle*).

-Size: Sometimes we can indicate the size of an object with a morpheme: this is the case of the diminutive. Nevertheless, although the most concrete meaning of diminutives is size, their most frequent meaning is affection (e.g., *doggie*). Diminutives are not very frequent in English (as compared to languages such as Spanish, for example).

English verbs have some special morphemes that carry some rather special meanings:

-Tense: If we add *-ed* to the stem of the verb, we indicate that the action was performed before the time of speaking (in the case of regular verbs of course): *she worked a lot*

-Person & number: if we add *-s* to the stem, we indicate that the action was performed by a third person (not the speaker or the hearer) in the singular number, and the tense is present: *she works hard*

-Aspect: if we add *-ing* we indicate that the action is still going on, *-ed* if the action has finished, etc: *she has worked*; *she is working*

The rest of the variations in meaning of the verb are done by combination with other words (the so called auxiliaries): e.g., *was working*, *has worked*, *will work*, *will be working*, etc. With these combinations, we can indicate in a precise way (well, more or less) at what time the action is performed or during how long, etc.

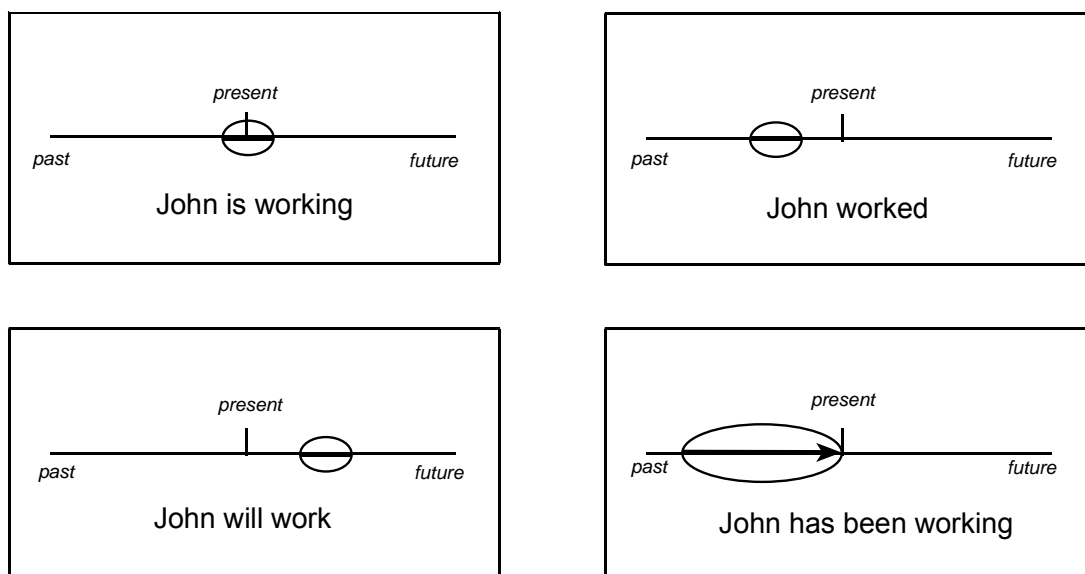


Figure 1.2. Illustration of the temporal axis and how verb combinations select a time period

These are not the only thinkable options: Spanish, for example, has more (for example, the distinction *pretérito imperfecto/pretérito indefinido*). And some other languages have even more (some Bantu languages have tenses for “yesterday”, “earlier today”, “some years ago” or “in ancient times”):

1.3.2.2 SOME DERIVATIONAL MEANINGS

The range of meanings associated with derivational morphemes is much bigger. These are a very few examples:

| MORPH- | MEANING | EXAMPLE |
|---------------|---------------------|---------------------|
| <i>-er</i> | the one that does X | <i>worker</i> |
| <i>-less</i> | without X | <i>penniless</i> |
| <i>-al</i> | relative to X | <i>derivational</i> |
| <i>-ation</i> | the result of X-ing | <i>realization</i> |
| <i>-ian</i> | pertaining to X | <i>Russian</i> |
| <i>-ology</i> | the science of X | <i>Biology</i> |

Although perhaps the list is not infinite, there are clearly many more notions that can be expressed with a derivational morpheme than with a inflectional one.

⊗ Try to identify the meaning of the following morphemes:

| MORPHEME | EXAMPLE | MEANING |
|----------|--|---------|
| -able | <i>fixable, drinkable, speakable</i> | |
| -ish | <i>reddish, longish, tallish</i> | |
| -ment | <i>enablement, excitement, entertainment, enchantment, development</i> | |
| -ic | <i>metallic, aristocratic, dramatic, majestic</i> | |
| -ness | <i>happiness, sadness, redness</i> | |
| -ize | <i>modernize, sterilize, familiarize</i> | |
| -ing | <i>shooting, sleeping</i> | |
| -ate | <i>activate</i> | |
| -ly | <i>quietly, slowly, quickly, softly</i> | |
| -ity | <i>reality, stupidity, nobility, brutality</i> | |
| -ous | <i>poisonous, gracious, prodigious, glorious, mysterious</i> | |

1.3.3 Lexical meaning

Finally, we reach lexical morphemes; that is, what most people understand by the notion of “word”. This is probable the hardest part of all, since we can express virtually anything with a word. For example, all the meanings that have been mentioned before, of grammatical morphemes, can be expressed lexically: number, for example can be expressed with a numeral (*one, two, three, four*, etc.). It looks as though we can refer to anything: things (animate, inanimate, concrete or abstract, real or invented), and feelings, ideas, and very abstract concepts, such as cause, force, etc.

Morphosyntactically, there are different types of words; we have things such as nouns, adjectives, verbs and adverbs, on the one hand, and then conjunctions, prepositions and determiners, on the other. They are quite distinct in many ways: in number, frequency, in time of acquisition, in flexibility, neurologically (some aphasic patients lose only closed class words). These differences are not always completely clear-cut (things rarely are in language); for example, for many authors, prepositions are in-between for classes. However, in general, the distinction open vs closed class items holds. Let us consider each of them in turn.

1.3.3.1 OPEN CLASS WORDS:

- *Nouns*: they express basically things, though not always; e.g., *redness* (a quality), *destruction* (an event), etc.
- *Verbs*: they are normally used to express actions, or states.

These two types of words are the most basic of all; they are probably universal (there are languages that have no adjectives, articles or adverbs, but it is unclear that there are languages without nouns and verbs). Nouns and verbs, by the way, are learned in different ways by children (for some other differences between nouns and verbs, cf. Gentner (1981) and Langacker (1987)). To these two categories, a third one is presently added:

- *Adjectives*: they are basically used to express qualities.

For many authors, these are the three more “basic” types of words; they refer to entities, events and properties, basically. We have seen that this has to be modified a bit, but still holds in general. The next category which is normally listed in the “open” class of words is the *adverb*.

- *Adverbs*: they are used mostly to modify situations (e.g., events, actions, etc.), and properties.

1.3.3.2 CLOSED CLASS WORDS:

Opposed to open class words, that can express any type of meaning, we have “closed” or “grammatical” word classes. They seem to behave a bit like grammatical morphemes (or even inflectional morphemes); the range of meanings they can express is rather limited (compared to open class words, anyway). While we can invent new meanings all the time in the “open” classes, it would be much more difficult to add a new meaning to the “closed” system. These are some closed or grammatical words:

- *Prepositions*: they are used to indicate relations of place, time and other things such as manner, causality, etc.
- *Determiners*: they are used to indicate reference. They help to clarify whether something has been mentioned before or not, or we are referring to all the instances of the entity or a particular one, etc. As we shall see throughout the course, determiners are one of the crucial instruments (at least in English, but also in Spanish) in determining the reference of a given word.
- *Conjunctions*: they are used to relate bigger chunks of meaning; we use them to indicate causality, coordination, etc., in general, how to relate

what is being said to previous speech.

1.3.4 Syntax

Clauses and phrases are probably the most basic syntactic structures: the former are used to communicate events and the latter, objects. We can express meaning by combining words, but as we shall see in next units, the ways in which this combination works are not that clear at all. To know exactly which parts of meaning are contributed by each word, or how is the meaning of the combination arrived at can be very tricky. To phrase it as a question, if “olive oil” is oil made of olives, where does “baby oil” come from? We will look at the problems of conceptual combination in more depth in next unit.

A more general question would be: can we indicate meaning by putting words in a particular order? How is syntax related to meaning? This is slightly controversial, and different linguistic schools would offer different opinions. Some points are agreed upon; for example, in Spanish, the different orderings of Adjective + Noun *vs* Noun + Adjective indicate a change of meaning (cf., *hombre pobre vs pobre hombre*).

Some studies from the acquisition of English has shown that children use syntactic information to infer the meaning of unknown words. By 1957, Brown suggested that young children might “use the part-of-speech membership of a new word as a first clue to its meaning”. To test this, he showed preschoolers a picture of a strange action done to a novel substance with a novel object. A group of children was told *Do you know what it means to sib? In this picture, you can see sibbing* (verb syntax); another group was told, *Do you know what a sib is? In this picture you can see a sib* (count noun syntax), and the third group was told, *have you seen any sib? In this picture, you can see sib* (mass noun syntax). Then the children were shown 3 pictures, one that depicted the identical action, one that depicted the identical subject, and a third one that depicted the identical substance. Brown found that children were sensitive to the syntax when inferring the meaning of a new word; they tended to construe the verb as referring to the action, the count noun as referring to the object and the mass noun as referring to the substance.

Children’s capacity to use syntax to infer meaning is called SYNTACTIC BOOTSTRAPPING. It has been very well documented in several domains. Katz, Baker and MacNamara (1974) found that even some 17-month-olds were capable of attending to the difference between count noun syntax (*this is a sib*) and noun phrase (NP) syntax (*This is sib*) when determining whether a novel word was a name for a kind of object or a proper name. Thus, when faced with an unfamiliar word, small children are able to exploit syntactic cues as way of narrowing down the semantic search space

Naigles (Naigles 1990, 1996, Naigles & Kako 1993) has studied the mappings from syntax to semantics that young children use in the course of verb acquisition.

In her experiments, she used the preferential-looking paradigm. Thus, her experiments involved two simultaneous videos, e.g., one of Big Bird and Cookie Monster turning synchronously, and another of Big Bird actively turning Cookie Monster. When small children hear an isolated nonce form, such as the nonsense verb *dacking*, they show a propensity for looking at the video involving the synchronous action. However, if the same group of children is shown the two videos along with a transitive sentence “*Big Bird is dacking Cookie Monster*”, then the children are no longer attracted to the synchronous turning action but, instead, tend to look at the video in which Big Bird is actively turning Cookie Monster. Conversely, if the two videos are shown together with an intransitive sentence such as *Big Bird and Cookie Monster are dacking*, then the youngsters will again display a tendency for looking at the video with the synchronous action. This suggests that small children do have a sense for the inherent semantics of syntactic configurations, as they are able to equate transitive and intransitive frames with different types of event structures

Goldberg (1995) has shown that sometimes grammatical constructions *per se*, without any lexical content, can convey a meaning of their own. This linguist studied sentences such as *She sneezed the napkin off the table*. She wondered how could it be possible that a verb such as *sneeze*, which, in principle, does not have any sense meaning “to move something by sneezing”, could acquire this meaning in this example. To make a long story short, she came to the conclusion that the meaning came *from the construction itself*. This was called the “Caused Motion” construction, and it would explain other “unconventional” examples involving motion such as *they laughed the poor guy out of the room* or *Mary urged Bill into the house*.

1.3.5 A big remnant: intonation and suprasegmentals

When speaking about phonology, we skipped an important linguistic mechanism to convey meaning: intonation. By varying the pitch of the way we pronounce, we can no doubt express nuances of meaning. Many times, the only difference among several interpretations of an utterance lies in intonation only. Probably, intonation (and context) would help to understand the intention of the speaker in each of these examples:

“I’ll be back,” promised MacArthur
“I’ll be back,” threatened Terminator
“I’ll be back,” reassured her Casanova
“I’ll be back,” lamented Sisyphus

The different interpretations of each of these instances of the same phrase (“*I’ll be back*”) would depend not only on the correct understanding of the context, but also on a certain intonation. Some phenomena (e.g., irony) depend crucially on

this. It is well known that intonation is processed in a different part of the brain; there are cases of people that have impaired one or the other system (the ‘purely linguistic’ or the intonational). That also explains why we can distinguish insults from compliments in an unknown language. Some of the “meanings” that can be expressed with intonation are:

- certainty or uncertainty (*This is the answer*),
- surprise (*can you play the piano?*),
- sadness or happiness,
- topic-selection (*I didn’t phone Peter on Sunday*).
- etc.

1.4 Language and thought

One of the questions asked at the beginning of this unit and that will probably emerge now and then during the course is the relationship existing between language and thought. How do we think? Do we think directly in language? Do we think in images or perhaps there is another mode of thought? What happens when we understand a sentence? We mentioned that we translate sounds into “ideas” (i.e. “meaning”). What is actually what goes on in people’s minds (or brains) when they understand some linguistic object?

Unsurprisingly, there are different opinions on this matter. This is part of a classic (and on-going) debate in Cognitive Psychology and Cognitive Science concerning the format in which information is represented, stored and manipulated in our brains. We can distinguish two opposing views. These two views could be named the *symbolic* vs the *non-symbolic* (for lack of a better term).

1.4.1. The symbolic view. According to a great number of scholars, minds are basically “symbol systems”. Concepts and ideas in our minds are symbols: arbitrary relationships between a form and a given content. A symbol system has a number of important features;

- (i) it involves a set of arbitrary physical tokens (which can be anything: patterns of neuronal firing, but also scratches on paper, holes on a tape, events in a digital computer, etc.);
- (ii) these tokens are manipulated on the basis of explicit rules and the manipulation is based on the shape of the physical tokens (i.e. it is syntactic and not based on meaning);
- (iii) the system of tokens, strings of tokens and rules are all semantically interpretable: they can be systematically assigned a meaning (e.g. a symbol stands for an object and a combination of symbols for a given state of affairs).

According to proponents of the symbolic model of mind such as Fodor (1980) and Pylyshyn (1980, 1984), symbol-strings of this sort capture the essence of our mental phenomena (such as thoughts and beliefs). Symbolists emphasize that the symbolic level (for them, the mental level) is a natural functional level of its own, and their description and functioning are independent of their specific physical realizations. For example, to explain the concept of “money”, it is no use looking just at neuron firing; you need a “higher” level of representation, the symbolic.

For symbolists, this implementation-independence (also called *multiple realizability*) is very important; to describe cognition (or intelligence) you don’t need to focus on implementation details, neurons and synapses, but on the logical structure, the combinations of abstract symbols. In this sense, cognition is like a computer program, which can be implemented on different physical supports. This is what classic Artificial Intelligence (also called Symbolic AI) tries to arrive at: our mental software. The driving metaphor is that our minds are computers: they do basically the same thing that computers do (manipulate symbols).

Related to this view is a complementary idea that holds that thought is basically linguistic. There exists a “language of thought”, which is basically linguistic in nature, though it does not correspond exactly to any actual language. When we understand an English sentence, for example, what we actually do is to translate the words we hear into this internal language of thought, also known as **Mentalese**. Probably, the most well known champion of the “**Language of Thought**” (LOT) **hypothesis** is Jerry Fodor; cognitive scientists such as Steve Pinker are firm followers. Mentalese is supposed to be an inner language that contains all of the conceptual resources necessary for any of the propositions that humans can grasp, think or express -in short, the basis of thought and meaning.

So, the idea is that the (main) representational system that underlies human thought, and perhaps that underlies thought in other species too, is semantically and syntactically language-like, i.e., it is similar to spoken human languages. Specifically, this representational system consists of syntactic tokens that are capable of expressing propositional meanings in virtue of the semantic compositionality of the syntactic elements. E.g., there are mental words that express concepts (and the like) that can be formed into true or false mental sentences. Fodor argues that thought must have these characteristics because cognition is *productive* (we are able to entertain an indefinitely large number of semantically distinct thoughts), *systematic* (it’s impossible to imagine a person who is able to entertain the thought that “John loves Mary,” and fails to do so with “Mary loves John”) and *compositional* (if you know the meaning of “John”, of “loves” and of “Mary”, you can combine them in a meaningful way; we understand complex thoughts because we understand the components and know how to combine them).

Thus, the approach which is still dominant today is to treat language as a symbol manipulation system: Language conveys meaning by using abstract, amodal, and arbitrary symbols (i.e., words) combined by syntactic rules.

1.5.2. The non-symbolic view

The symbolic view of cognition has met many opponents. One of the major criticisms is that of “symbol grounding problem”: how to connect symbols in our mind to the external world. In the symbolic view, symbols are ‘semantically interpretable’, which means that they are assigned a meaning. But the question is who does that? How does that work? To get a grasp of the problem, we can look at one of the best-known criticisms, the thought-experiment proposed by the philosopher John Searle which is known as the “Chinese room”. It goes like this:

An ex-Oxford philosopher, JRS, is placed in a room with baskets full of Chinese logographs. JRS does not know Chinese, nor can he relate the logographic symbols to any concepts. To him, “Chinese writing looks like so many meaningless squiggles” (Searle 1990: 20).

JRS does have access to a rule book, however, which is written in English and says things such as: “Take a squiggle-squiggle sign from basket number one and put it next to a squoggle-squoggle sign from basket number two” (*ibid.*).

Crucially, these rules refer to the logographs solely on the basis of their written shapes and nothing else, and this in turn allows JRS to perform the task of correlating certain Chinese symbols with certain other Chinese symbols. In other words, JRS simply follows the rules for manipulating the symbols, oblivious to their meanings.

Outside the room, people who *do* understand Chinese hand in batches of logographs through a small slot, and JRS responds by manipulating the symbols in accordance to the cleverly constructed rule book. In fact, the rule book is so cleverly devised that, when the Chinese speakers receive the output, they find JRS’s answers to make perfect sense:

For example, the people outside might hand me some symbols that unknown to me mean, “What’s your favorite color?” and I might after going through the rules give back symbols that, also unknown to me, mean, “My favorite is blue, but I also like green a lot.” (*ibid.*)

The Chinese Room is the computer; Searle uses this example to criticize classical Artificial Intelligence approaches and show that the understanding that goes on in language comprehension cannot be based solely on symbol manipulation. Syntax is not enough for comprehension; you need something else.

A growing number of scholars have proposed different alternative views on cognition. One of them is the view is that meaning is **embodied**—that is, that it derives from the biomechanical nature of bodies and perceptual systems. Our bodies constrain our interactions with the world (our experiences) and therefore

shape the structure and content of our thoughts and concepts. Thus, linguistic meaning is grounded in bodily activity.

When we perceive, our body senses communicate with our brain via the central nervous system. We have cells whose duty is to convey information about our external environment: cells that are sensitive to information about light, about sounds, etc. Our different senses (i.e., vision, sound, touch, smell, taste, movement, etc.) register information about the world in a way which is specific to the human species, and send it up to the brain. Each of these senses activates different parts of our brain, since, more or less, we have specific parts in the brain devoted to “registering” special kinds of information (Figure 1.3). Due to our past as apes, for example, it seems that a lot of brain tissue is devoted to vision.

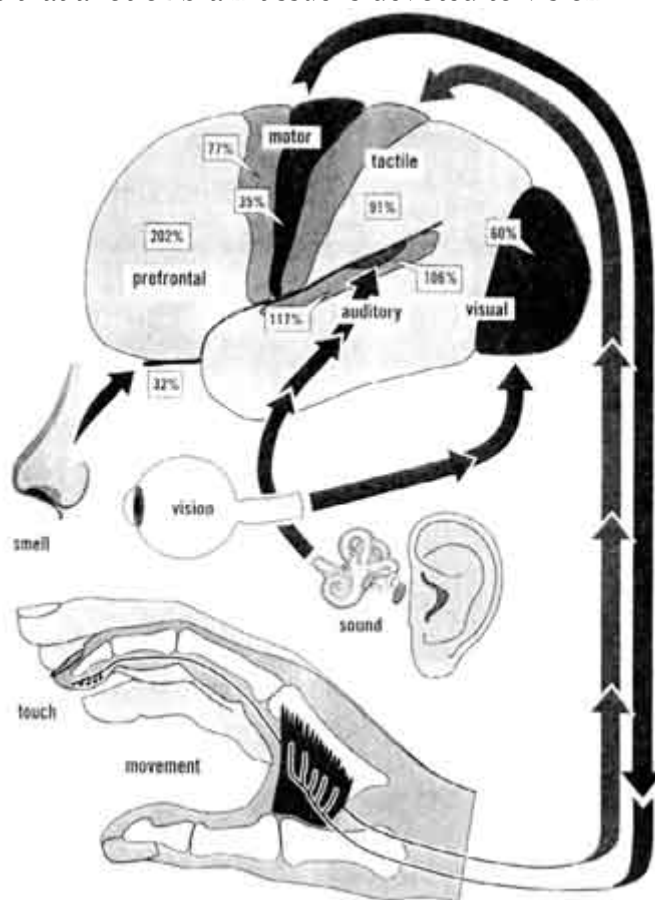


Figure 1.3. Areas of the brain devoted to sensory information

For example, the cells in the retina of our eye register information about light variations in the world. These visual cells (which are actually neurons) in our eyes are also “specialized”: they are sensitive to different types of information. Some of them “fire” (i.e., are activated) when they register the wavelength of some special color (e.g., red); some are specialized to detect movement, or contrasts in light, certain orientations, etc. It seems that at first these nervous impulses travel up to the brain, and there they could be represented “topologically” (that is, the way the information is represented in our brain and the external stimuli have some kind of correspondence, as in Figure 1.4).



Figure 1.4. A circular stimulus and its representation in a monkey's brain

Figure 1.4 represents an experiment in which a monkey was trained to stare at a pattern that looked as a bulls eye. The animal was injected with a radioactive kind of glucose that highlighted which neurons were active during the perception of the stimuli. As can be observed, once the brain was “developed” (as in a film), a close correspondence was found between the stimulus and its brain representation (that is what we call “topological”). However, this lasts but a very short time: sensory stimuli undergo many transformations; perception is a very complicated business and there are at least seventeen different “maps” or parts where visual information is processed (and recent authors speak of as many as thirty-two).

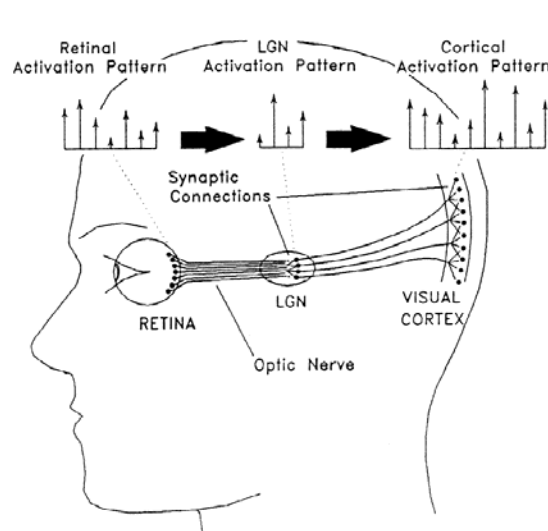


Figure 1.5. The beginning of the visual signal processing

Very roughly, during the processing of the visual signal, some of the perceived details are filtered out, top-down information comes in (that is, our knowledge of how things look like; we will talk about this in more detail in forthcoming units), and any resemblance between the way the information was perceived and the way it

is represented is lost. Seeing something is not the business of our eyes, but of our brain. What seeing something actually means is that certain networks of neurons become active. Something similar happens with other perceptual categories: with sound, with touch, etc.

Now, in concepts for concrete objects, we somehow “store” these packets of neural representations from different informational sources. With the concept CAT, for example, we store a representation of the neuronal networks of seeing of cat, of hearing a cat, of touching a cat., plus all other conceptual information, and when we activate the concept “cat”, all this information (or a version of it) is “re-enacted” and we come to think of a cat. The neural networks containing information about the cat is what we could call the meaning of cat.

The ways in which a concept is activated can be very different: any of the parts that form the concept can act as a cue or a link to the general concept: the sight of a cat, a meow, etc; other related concepts can also activate it (like a dog, or a mouse). And, of course, mentioning the sounds /kæt/ in English, or /gato/ in Spanish. This means that the format in which we store meaning is not amodal, but modal: it is related to the different perceptual or motor systems of the brain. There is considerable evidence that this is indeed the way in which the brain represents both words (cf. Pullvermuller’s (2001) paper in the journal *Behavioral and Brain Sciences*, Words in the Brain’s language) and concepts (e.g., Barsalou’s papers).

So, selective attention focuses on components of experience; once attention selects a perceived aspect of experience, associative areas in the brain capture the respective pattern of activation in the relevant perceptual, proprioceptive, introspective area, etc. Later, these associative areas partially reactivate these perceptual representations in the absence of perceptual input, thereby simulating the experience of what an external or internal event was like. Using such simulations, people conceptualize objects, external events, and internal events in their absence.

There are different theories that try to base their explanation of this type of embodied approach: Barsalou’s *Perceptual Symbol System*, Lakoff’s *Embodied Construction Grammar*, or Glenberg’s *Indexical Hypothesis* would be some examples of theories that opt for this vision of cognition and language. Let’s briefly look at one of them, Glenberg’s Indexical Hypothesis.

The **Indexical Hypothesis** (IH) proposes that meaning is based on action (Glenberg & Robertson, 1999, 2000). Language is made meaningful by cognitively simulating the actions implied by sentences. For example, consider how a situation (e.g., a room with a chair) could be meaningful to an animal. By hypothesis, the meaning of the situation consists of the set of actions available to the animal in the situation. The set of actions results from *meshing* (i.e., smoothly integrating) “affordances” to accomplish action-based goals. *Affordances* are potential interactions between bodies and objects (Gibson, 1979). Thus, a chair affords sitting for adult humans, but not for mice or elephants, who have the wrong sorts of bodies to sit in an ordinary chair. A chair also affords standing-on for the human. If the human has the goal of changing a light bulb in the ceiling, the meaning of the situation arises

from meshing the affordances of a light bulb (it can be held in the hand) with the affordances of the chair (it can be stood on to raise the body) to accomplish the goal of changing the bulb. According to the IH, three processes transform words and syntax into an action-based meaning. First, words and phrases are indexed or mapped to perceptual symbols (Barsalou, 1999; Stanfield & Zwaan, 2001). Unlike abstract symbols, perceptual symbols are modal (i.e., dependent on the mode of perception) and nonarbitrary (i.e. based on the brain states underlying the perception of the referent and therefore related to them). Second, affordances are derived from the perceptual symbols (Glenberg & Robertson, 2000; Kaschak & Glenberg, 2000). The third process specified by the IH is that affordances are meshed under the guidance of syntactic constructions (Kaschak & Glenberg, 2000). The grammatical form of the sentence directs a cognitive simulation that combines the affordances of the different elements. If the meshed set of affordances corresponds to a doable action, the utterance is understood. For example, one can judge that the sentence, “Hang the coat on the upright vacuum cleaner” is sensible, because one can derive from the perceptual symbol of the vacuum cleaner the affordances that allow it to be used as a coat rack. Similarly, one can judge that the sentence “Hang the coat on the upright cup” is not sensible in most contexts, because cups do not usually have the proper affordances to serve as coat racks. If the affordances do not mesh in a way that can guide action (e.g., how could one hang a coat on a cup?), understanding is incomplete, or the sentence is judged nonsensical, even though all of the words and syntactic relations may be commonplace. That is why we say that language is made meaningful by cognitively simulating the actions implied by sentences.

| Symbolic approaches | Non-symbolic approaches |
|--|---|
| <ul style="list-style-type: none"> • Classical Artificial Intelligence • Digital treatment of information • Symbol systems: symbols as amodal, abstract and arbitrary • Language of Thought Hypothesis • Innateness • Knowledge is modular • Software matters; hardware doesn't (multiple realizability) • Syntax matters; semantics is less important | <ul style="list-style-type: none"> • Connectionism and neural networks • Analogical treatment of information • Perceptual Symbol systems: symbols as modal and embodied • Linguistic relativity • Non-innateness; learning • Knowledge is distributed • Hardware is also important; implementation details are important • Syntax is not enough; semantics is also needed |

Table 1.2. Some characteristics of symbolic vs non-symbolic approaches to cognition.

1.5 Organization of this course

Some meanings will be expressed in different linguistic ways (as we can express “number” with a morpheme or with a lexical word), and some linguistic elements will correspond to more than one meaning. The rest of the course will try to look at this question with some detail. Though we have only begun our survey, we can already foresee that the relations of “parts of meaning” with “parts of language” is going to be a highly complex one; we can say that the “mapping” will be many to many:

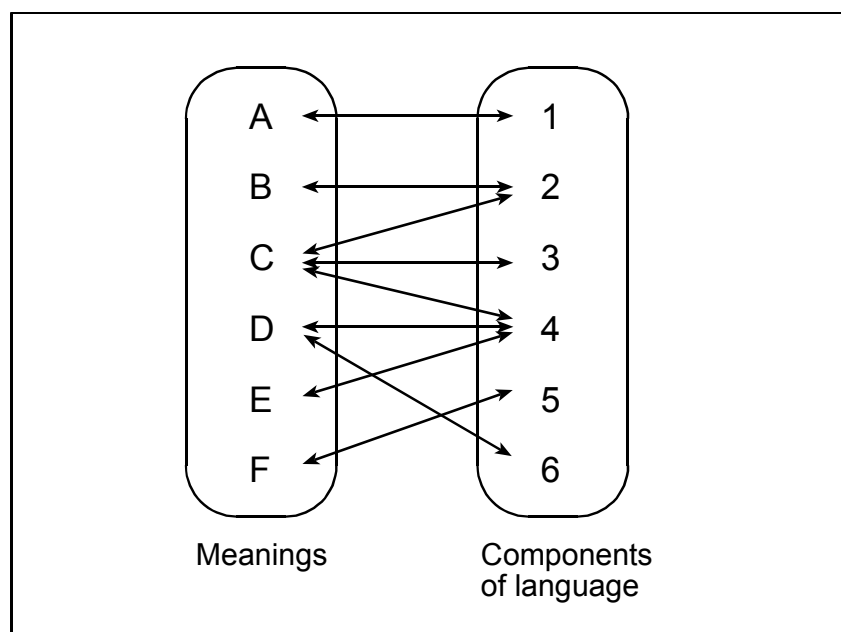


Figure 1.6. Many-to-many mapping between elements of meaning and elements of language

Since it is not possible to attack every point at the same time, we will divide things into three levels, following the distinction by Givón (1984). First, we will look at the meaning of words, called ‘**lexical semantics**’. Then, we have the meaning of sentences, how to describe scenes; this is the realm of ‘**sentential semantics**’. Then, we have bigger concerns, how meaning is established in a wider, more contextual way; this is the realm of ‘**discourse semantics**’. Though this distinction is somehow artificial, it is not completely arbitrary. These three “parts” of meaning are processed by different psychological systems; words (lexical semantics) are stable bits of information; they are stored in long-term memory; they are more stable across contexts and culturally based. Sentences are created on-line; they are processed by short-term memory, and their limits and characteristics must be different from lexical semantics. Finally, discourse semantics is also short-term,

though more contextual (cf Givón, 1984, 1998). Of course, this is merely a methodological division. Many times, these levels overlap, and we will have to speak of several levels at the same time.

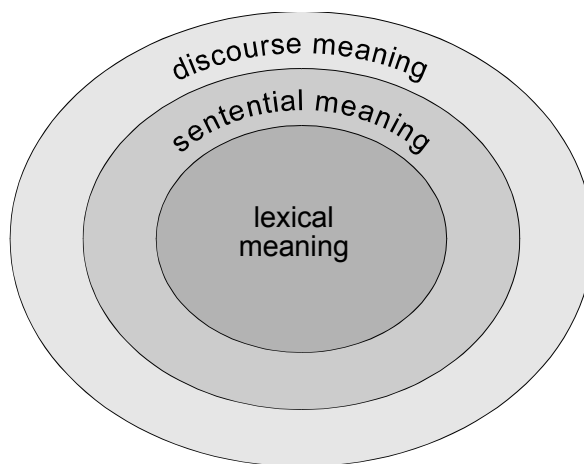


Figure 1.7. Layers of meaning

1.6 Exercises

- ⊗ Are there things that we can think of but cannot express linguistically? Discuss:
- ⊗ Try to indicate all meaningful parts of the following text:

In a hole in the ground there lived a hobbit. Not a nasty, dirty, wet hole, filled with the end of worms and an oozy smell, nor yet a dry, bare, sandy hole with nothing in it to sit down on or to eat: it was a hobbit-hole, and that means comfort.

*'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe
All mimsy were the borogoves
and the mome raths outgrabe*

*Brillaba, brumeando negro, el sol;
agiliscosos giroscaban los limazones
banerrando por las váparas lejanas;
mimosos se fruncían los borogobios
mientras el momio rantas murgiflaba*

*Beware the Jabberwock, my son!
The Jaws that bite, the claws that catch
Beware the Jubjub bird and shun
the frumious Bandersnatch*

*¡Cuidate del Galimatazo, hijo mío!
¡Guárdate de los dientes que trituran
y de las zarpas que desgarran!
¡Cuidate del pájaro Jubo-Jubo y
que no te agarre el frumioso Zamarrajo!*

- ⊗ Identify the following pictures as icons, indices or symbols:



:-)

:-(

:(

:)

;-)



I ♥ NY

⊗ Think of cases in which different intonations of a sentence alter its meaning. For example: *you are going to marry him.*

⊗ Can you think of any part of language that does not convey some meaning?

⊗ Can you think of any concept or idea for which we do not have a name?

⊗ All the information that we listed in our “coffee” example is clearly culturally-based. Quite probably, even in the same culture, nobody has exactly the same information about coffee as anyone else. You could say that there are no two *exact* meanings of the concept “coffee” out there. How is it possible then that we can communicate? Do we understand each other when we talk?

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