

# 1 What is semantics about?

## 1.1 Semantics: study of the relation between form and meaning

### 1.1.1 Language relates physical phenomena to meanings

When my mouth opens and a certain racket, noise comes out, such remarkable things occur as that I make a statement, ask a question, or give an order. We can say of this racket such remarkable things as: it is true, false, intelligent, stupid, irrelevant or uninteresting. How is it possible?

This is puzzling, because after all, what I emit is a mere acoustic blast. How is it possible that an acoustic blast can acquire semantic properties? How does a noise acquire meaning? One way to put this question is:

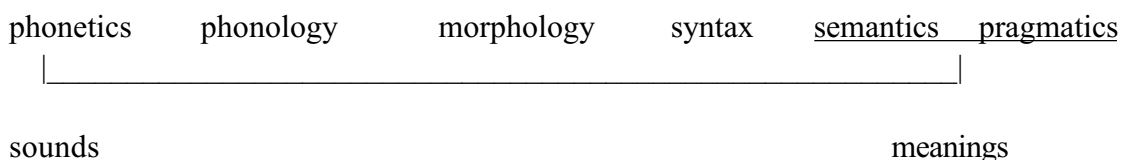
HOW DO WE GET FROM CERTAIN BRUTE PHYSICAL FACTS TO MEANINGS?  
HOW DO WE GET FROM THE PHYSICS TO THE SEMANTICS?

Many disciplines of cognitive science are concerned with these questions. Linguistics, which is one of these disciplines, narrows down this question in the following way.

The crucial question of linguistics:

HOW ARE FORM AND MEANING SYSTEMATICALLY RELATED IN AN ADEQUATE GRAMMAR OF NATURAL LANGUAGE?

We may distinguish different linguistic fields according to which part of this question they focus on :



The physical side of linguistic utterances—the articulation and perception of speech sounds (articulatory, acoustic and auditory)—is the domain of **phonetics**. It is not a trivial task to study the physical properties of articulatory movements and the physical properties of acoustic phenomena related to spoken language. Thanks to the progress in sciences like acoustics, we have a body of significant findings.

**Phonology** is the study of the sound patterns of human language. What are the smallest meaning distinguishing units (=phonemes) in a given language?

cat  
sat  
**bat**  
mat

Speech sounds as physical entities may be infinitely varied, but when they function as elements in a language, as phonological units, they are highly constrained. Native speakers of any language intuitively know which sequences of speech sounds are words or could be words in their language.

English  
*blue*

English-like  
*grue*

Not English-like  
*prst*

Czech tongue twister  
*Strc prst skrz krk*

**Morphology**: the structure of words and the smallest meaning-bearing units and how they combine into words:

new word-formation:

pulver-ize

woman-ize

allowable combinations of morphemes:

un-able

\*un-apple

un-do

**Syntax:** the formation of sentences, how words are combined to larger units than words, to phrases and sentences

\*portrait Rembrandt painted that a  
A portrait that Rembrand painted

**Semantics:** Semantics is the study of meaning expressed by elements of a language, characterizable as a symbolic system.

## **1.1.2 What is meaning?**

(based on Nagel, Searle)

### **1.1.2.1 Aboutness of language**

The subject matter of semantics (and also pragmatics) is more difficult to grasp than that of other linguistics disciplines. A noise or a scribble and sign-language gestures are physical objects. They are physical objects just like your left shoe, the trees outside of this building and the twitterings of birds. However, unlike those other physical objects, a noise that I make when I speak or a scribble on paper has meaning. IT IS ABOUT SOMETHING. This is apparently what makes linguistic signs like words different from your left shoe or the twitterings of birds, which are not *about* anything, as far as we can tell. The property of ABOUTNESS of linguistic signs (= symbols) is one of the defining properties of natural languages.

### 1.1.2.2 Where is meaning?

What makes words (and other expressions) meaningful is that they are about the things in the world, what makes them meaningful is their relation to the things in the world. But meanings, the entities that semantics investigates, cannot be directly observed. The mystery of meaning is that it does not seem to be located in any single place—

not in the word (a noise or a scribble),

not in the objects that are described by words,

not in the mind (in a separate concept or idea hovering between the word and the things we are talking about).

Let me explain it. First, it is important to notice that meanings are not located somehow in the physical shape of words, that is, words cannot be defined in terms of physics.

There are three arguments for this point:

Meanings cannot be defined in terms of physics:

(i) In general, there are no physical features that all meaningful noises or sets of marks have in common which serve to differentiate them from other signals or noises.

(ii) Usually there is no resemblance between a name and the thing it is the name of. Linguistic forms usually lack any physical resemblance with the entities that they stand for.

(iii) Not only do languages vary in their vocabularies, but also within one language the relation between the words and what they stand for changes (ex. *gay*).

(i) – (iii) are directly related to “the ARBITRARINESS of the linguistic sign” (Ferdinand de Saussure, 1916, *Cours de linguistique generale*): the connection between a word and what it stands for is ARBITRARY. This is one of the defining properties of human language.

First, there are no physical features that all true utterances have in common, no physical features that all speech acts have in common that make them speech acts, and indeed, no physical features that all grammatical sentences have in common which serve to differentiate them from other signals or noises.

Second, words and other linguistic expressions do not have meanings, because of their sound or look, of their physical features. Exceptions: There are some words, like “BANG”, “WHISPER”, “BUZZ”, “SPLASH”, “MURMER”, “MUMBLE” (ONOMATOPOEIA), which sound a bit like what they refer to (they are partly or wholly ICONIC) and they may be very similar across languages:

CUCKOO (English)

KUCKUCK (German)

COUCOU (French)

There is some arbitrariness, or conventionality, even in the onomatopoeic forms, since they often conform to the phonological systems of particular languages, rather than being directly imitative of what they stand for.

Third, I can make the same statements using the English sentence *This is an apple* and the Russian sentence *Eto jábloko* with the same meaning. Whatever relation the English word *apple* has to the particular piece of fruit, words for the apple in other languages can have as well. In addition, within one language the relation between the words and what they stand for changes (ex. *gay*).

One of the defining properties of human language is “the ARBITRARINESS of the linguistic sign” (Ferdinand de Saussure, 1916, *Cours de linguistique generale*): the

connection between a word and what it stands for is ARBITRARY. There is no resemblance between sound and meaning, the relationship is said to be ARBITRARY.

The relation between a word and the thing that it names is not a resemblance relation, it must be something entirely different. It cannot be located in the objects that we talk about. A given word like *apple* as we use it refers not just to the particular apples that you have seen or that are around us when we use it, but to all apples, whether or not you know of their existence. You may have learned the word by being shown some sample, but you will not understand it if you think it is just the name of those samples. You and I, who have encountered different examples of apples, use the word *apple* with the same meaning.

This suggests that the relation of the word *apple* to all those particular apples in the past, present, and future, is INDIRECT. The word *apple* as you use it has something else behind it--a concept, idea, thought or sense--which somehow reaches out to all the apples in the universe.

INDIRECT RELATION BETWEEN THE WORD AND THE WORLD

**word** ————— a concept, idea, thought ————— **thing in the world**  
*apple*

This indirect relation between the word and the world raises new problems: It looks as though we have just complicated the problem. In trying to explain the relation between the word *apple* and the thing apple by interposing between them the idea or concept of ‘apple’, we have just created further need to explain the relations between the word and the idea, and between the idea and the stuff. What is this middleman ‘a concept, idea, thought’?

IS IT IN YOUR MIND?

The problem seems to be that very particular sounds, marks, and examples are involved in each person's use of a word, but the word applies to something universal, which other particular speakers can also mean by that word or other words in other languages. The universal element APPEARS to be provided by something we all have in our minds when we use the word. If I say

“Gold is getting more and more expensive”

I certainly may have an image of some sort in my mind: perhaps of a gold bar, or of some gold coins, or the gold in my ring. This, however, will not explain the generality of the meaning of the word, because any such image will be a PARTICULAR image. It will be an image of the appearance of a particular sample of gold. How is *that* supposed to encompass all actual and possible examples of gold? EVERY PERSON will probably have a DIFFERENT PICTURE; yet that does not prevent us all from using the word with the same meaning.

IS THE CONCEPT SOMETHING OUTSIDE YOUR MIND THAT YOU SOMEHOW LATCH ONTO?

It would have to be something that you and I and a speaker of French or Japanese or Spanish call ALL latch onto, in order to mean the same thing by our words for an apple.<sup>1</sup> But how, with our very DIFFERENT EXPERIENCES of the word and the fruit, do we do that? How is this idea or concept related to ALL THE SAMPLES of actual apples? What kind of thing is it that it can have this EXCLUSIVE CONNECTION with an apple and nothing else?

Where is meaning? Answer (summary):

The meaning of words cannot be derived from their **physical properties**, it cannot be reduced to the **real-world objects** or their perception, and it cannot be reduced to the **particular image in my or your mind**. The meaning of words is to be derived from the relations between words, concepts and things in the real world.

---

<sup>1</sup> Frege assumes that senses or ideas are **entities of a particular immaterial kind**. (Plato: ideas exist outside the physically accessible world. Gottlob Frege (1848-1925): ideas exist in the “third realm”; according to Frege, there are three realms of entities: the mental, the physical and the third realm.)

### 1.1.2.3 Language is a social phenomenon

Each person does not make it up from scratch for herself or himself. When as children we learn a language, we get plugged into an already existing system, in which many people have been using the same words to talk to one another. My use of the word “gold” does not have a meaning just on its own, but rather as part of the much wider use of that word in English. So we have to explain how my use of the word gets its content from all those other uses, most of which I do not know about--but putting my words into this larger context may seem to help explain their universal meaning.

INTENTIONS IN COMMUNICATION. When you take a noise or a scribble to be an instance of something that conveys meaning, something that is an instance of linguistic communication, as a message of some sort, you must regard it as having been produced by a being with certain INTENTIONS. You cannot regard such a noise or a scribble as just a brute physical fact, like your left shoe, a tree, a stone, a waterfall. For example, past and present attempts to decipher the Mayan hieroglyphs presuppose that the marks we see on the stones were produced by human beings and produced with certain kinds of intentions. If we were certain that the marks were a consequence of erosion, for example, then the question of deciphering them or even calling them hieroglyphs could not arise.

What are the intentions that we presume motivated the production of the Mayan hieroglyphs? Crucially, the writers intended to COMMUNICATE something to the readers, they INTENDED to produce an understanding ABOUT some topic in the readers.

Meaning that is conveyed by some marks, scribbles or noises consists in part in the intention on the part of the speaker or writer to produce some understanding in the hearer. The communication is only successful to the extent that the idea the hearer or reader gets is the same idea that the speaker or writer intended the hearer or reader to get.

CONVENTION. This also means that what a given linguistic sign is about or represents must be publicly recognized, accepted, acknowledged, or otherwise believed by the

language users, in other words what a linguistic sign represents is determined by some publicly accepted convention.

What must be the case in order for the word CHAIR to designate this particular piece of furniture in the world? How can the word CHAIR have the function of designating this particular piece of furniture in the world? There must be publicly recognized, accepted, acknowledged, or otherwise believed by the language users that the word CHAIR stands for this particular object in the real world and also for all the chairs that there were, are and will exist in the real world. In other words, the word CHAIR, which is a physical thing—a sound or a scribble—'stands for' another thing, a particular piece of furniture, and it does so by some publicly accepted *convention*:

Notice that if I started to use the word CHAIR to designate bottles without giving you any warning, there would be a lot of confusion in communication between you and me. For example, you would be confused as to what I mean if I said something like 'This chair contains wine'. You could even conclude that I do not know English. That is, I as a speaker cannot use just any linguistic sign to convey just any meaning I intend to convey. I must also follow a public agreement or convention that the word CHAIR is used to designate a specific type of furniture. In short, meaning is more than a matter of intentions of individual speakers, it is also a matter of convention that is accepted across language users. (See Wittgenstein).

CONSTITUTIVE RULE. Following John Searle (1995, *The Construction of Social Reality*), a philosopher of language, we may say that the representational ABOUTNESS function of a language sign X is constituted by the symbolic 'stand for' relation, where one thing X represents another Y (its status function or meaning) by *convention* that is publicly acknowledged.

Constitutive rule for linguistic symbols:

X (symbol) stands for Y (meaning) in context C, and it does so by some public convention.

The public convention is crucial here, because there is nothing inherent in the noise [CHAIR] or the scribble ‘CHAIR’, in their physical shape, which makes them necessarily connected to a particular type of furniture. Clearly, different languages use different noises and scribbles to designate this piece of furniture: e.g., German STUHL. Linguistic signs *mean* or *represent* or *symbolize* something beyond their purely physical properties. Another way to put it is to say that the connection between a word and what it stands for is ARBITRARY. In fact, one of the defining properties of human language is “the ARBITRARINESS of the linguistic sign” (Ferdinand de Saussure, 1916, *Cours de linguistique generale*).

Apart from language, other facts that in some sense are facts by human agreement (e.g., facts about money, governments, property, marriage, universities) can be motivated in essentially the same way: What stands to the sound [CHAIR] as its meaning is what stands to a piece of paper as its function as a dollar bill.

Constitutive rule for institutional facts:

X stands for Y (status function) in context C, and it does so by some public convention.

- Examples:
- (1) This piece of paper stands for a one-dollar bill.
  - (2) The person who kills another (X term), under certain circumstances (C term), and is found guilty of so doing is assigned the status of ‘convicted murderer’ (Y term, and hence an institutional fact).

For example: This piece of paper stands for a one-dollar bill. Now, because there is nothing about the physical properties of a piece of paper, its shape, color, etc. that would guarantee on their own that a given piece of paper counts as money, there has to be some collective public agreement that it counts as money. We attribute a function or status to this piece of paper, namely of being money, and this function goes well beyond its physical properties, and is in fact independent of its physical properties. Hence, the Y term has to assign a new status to a given object that the object does not already have just

in virtue of satisfying the term X. This assignment of function crucially depends on some collective public agreement.

Another example: The person who kills another (X term), under certain circumstances (C term), and is found guilty of so doing is assigned the status of ‘convicted murderer’ (Y term, and hence an institutional fact).

According to Searle, language plays a crucial role in the construction of such social facts, facts that have an objective existence only because we believe them to exist.

To sum up (ABOUTNESS of language): Linguistic signs have a representational or symbolic function that relies in a crucial way on the intentions of language users to use them to communicate a certain meaning. In addition, meaning is more than a matter of intentions on the part of individual language users, it is also a matter of convention.

The property of ABOUTNESS of linguistic signs (= symbols) is truly unique to linguistic signs that is missing from other signs.

For example, a rabbit’s tracks in the snow mean that the rabbit has recently passed by. Or, when we see smoke we assume that it means there is also fire somewhere. A sign like this call is called an INDEX. Unlike linguistic signs, or symbols, they are NOT arbitrary, because there is a necessary causal connection between the sign and what it means. Consequently, they are also NOT conventional, what such signs mean is not established by a convention, by some public collective agreement. And such signs like a rabbit’s tracks are not produced with an intention to communicate something to you, they cannot be intentionally used to talk about or to refer to rabbits in general, all those rabbits that existed, exist and will exist.

There are also signs like the bathroom signs: typically, a stick figure with a skirt ♀ and a stick figure without a skirt ♂. Such signs are not arbitrary, because they iconically reflect what they are supposed to signify. We call them icons. Icons are partly conventional.

Traffic signs are another good example. Their shape is clearly iconically related to their meanings, but we need to learn the conventional connection between the sign and its meaning in many instances. To summarize, there are three main types of signs:

- 3 kinds of SIGNS: INDEX : smoke means fire (NOT arbitrary, NOT conventional)  
ICON: bathroom signs (NOT arbitrary, partly conventional)  
SYMBOL: natural language, formal languages like algebraic languages, programming languages, first order language, etc. (arbitrary and conventional)

The theory that provides a unifying analysis of various sign systems is called SEMIOTICS.

Summary of the first lecture:

1. There is an INDIRECT RELATION BETWEEN THE WORD AND THE WORLD:

word—— **IMAGE, CONCEPT, IDEA, THOUGHT** ——thing in the world

*house*



2. The subject matter of semantics (and also pragmatics) is more difficult to grasp than that of other linguistics disciplines. The meaning of words cannot be derived from their

- **physical properties,**
- it cannot be reduced to the **real-world objects** or their perception, and
- it cannot be reduced to the **particular image, concept, idea in my or your mind.**

The meaning of words is to be derived from the relations between words, concepts and things in the real world.

3. Words, and linguistic signs have a **representational** or **symbolic** function (i.e., they are **ABOUT** something that goes beyond their physical shape).
4. The symbolic function of linguistic signs crucially relies on the **intentions** of language users to use linguistic signs in order to **communicate** certain meanings to other language users. Any communication is only successful to the extent that the idea the hearer/reader gets is the same idea that the speaker/writer intends the hearer/reader to get.
5. In addition, linguistic meaning is more than a matter of intentions on the part of individual language users, it is also a matter of **convention**. The representational / symbolic (ABOUTNESS) function of a language sign X is constituted by the ‘stand for’ relation, where one thing X represents another Y (its status function or meaning) by *convention* that is publicly acknowledged. This is essential given that the connection between a linguistic sign and what it stands for is **arbitrary**.

## 1.2 Theories of meaning

Different theories of meaning can be distinguished, according to how they deal with the relation between words, concepts and things in the world, and the conventions that are constitutive of this relation. The main types that dominate the linguistic field today can be split into two very large classes:

**REFERENTIAL THEORIES OF MEANING**

**MENTALISTIC, COGNITIVE AND CONCEPTUAL THEORIES OF MEANING**

### 1.2.1 Referential theories of meaning

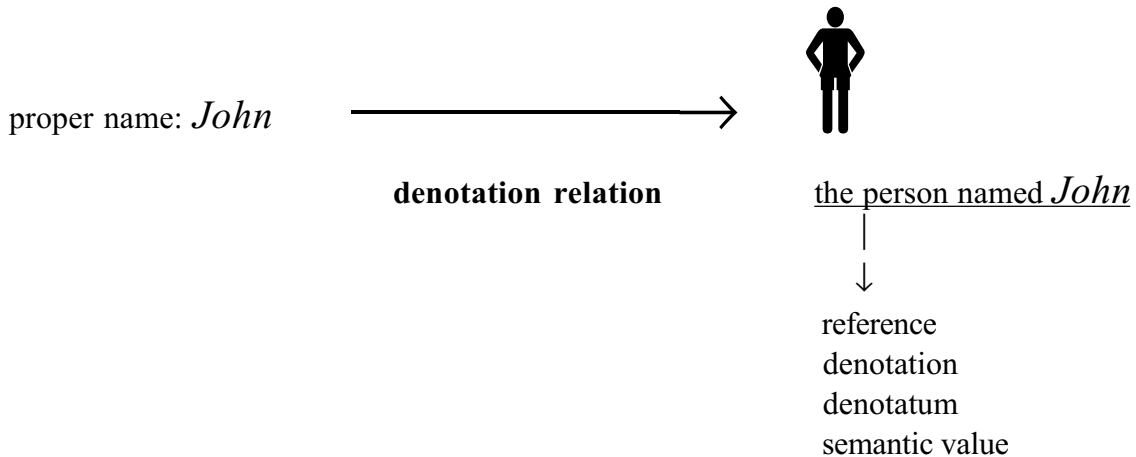
Referential theories of meaning have their origins in the philosophy of language, logic and mathematics:

- Gottlob Frege (1892)
- Bertrand Russell (1905)
- Alfred Tarski (1933, 1944)
- Peter Strawson (1950)
- Richard Montague (1970)

Referential theories are concerned with the relation between expressions and the external world. The referential theory is used to explain our knowledge of linguistic meaning, but makes no claim about how we actually know how linguistic expressions acquire meaning. In other words, it makes no psychological claims. A referential theory of semantics assumes that

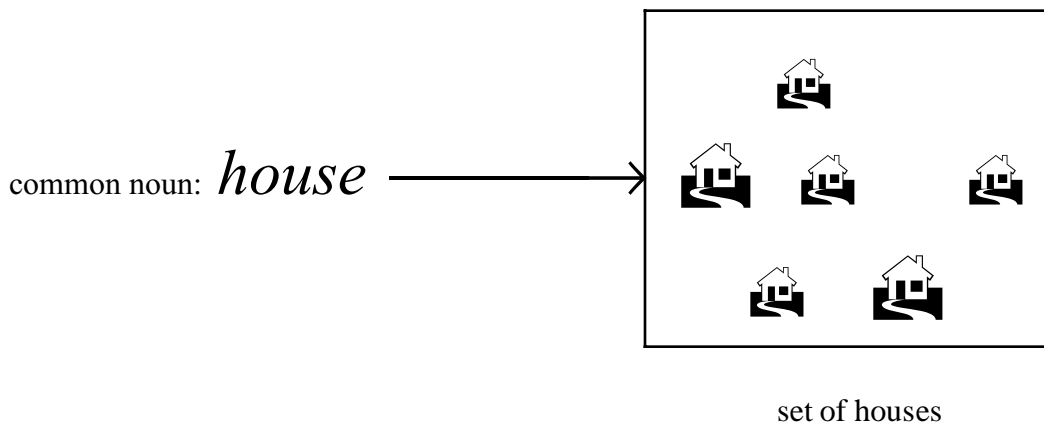
MEANING IS REFERENCE TO FACTS OR OBJECTS IN THE WORLD.

For example, a proper name *John* refers to or denotes its bearer: a person named *John*.



The denotation relation constitutes the most fundamental semantic relation.

The same paradigm can be extended to kinds of expressions other than proper names, to expressions of any kind. The meaning of the word *house* (syntactic category: common noun) is what the word refers to, points out, in the world. The denotation of the word *house* right now is the set of all houses that there are right now in the world. If the relevant world, or domain of reference, were this classroom, then the meaning of the word *house* would be an empty set.



Intuition: Could we say that we understand the meaning of the word *house* if we did not know what it referred to in the world? I think not. Hence, it makes sense to assume that the meaning of a word like *house* consist of its being related to a certain object, to its semantic value, denotation.

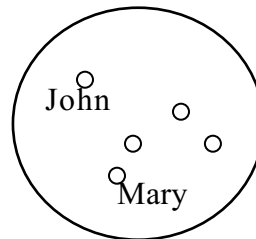
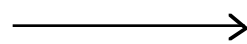
Take another example: *The tallest man in the world lives in Los Angeles*. The reference of the subject NP in this sentence is determined by whoever satisfies or fits the descriptive content expressed by the nominal *the tallest man in the world*. *The tallest man in the world* is a definite description.

definite description: *the tallest man in the world* →



What do verb phrases and sentences denote? The reference of an **intransitive verb** (syntactic term) or a **one-place predicate** (semantic term) *walk* is a class of individuals who have the property of walking, who walk. The verb *walk* denotes a certain set or collection of individuals--the set of walkers.

one-place predicate : *walk*  
intransitive verb



set of walkers

*John is walking*

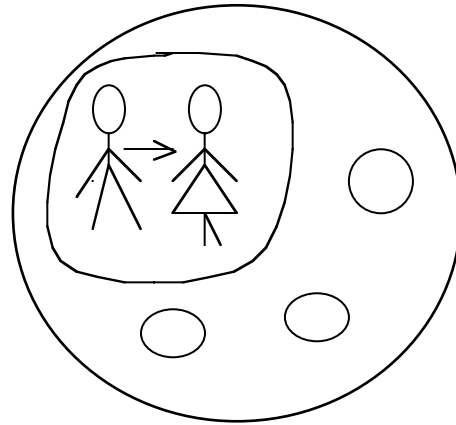
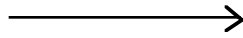
true iff the person John is in the set of walkers

Notice also that if you hear a sentence like *John walked*, the experience with how human beings typically move, that walking is slower than running, how it relates to other ways in which we move: jumping, hopping, etc. However, these things are mostly left out of the theory, at least in its most simple instantiations.

The reference of a **transitive verb** (syntax) or a **two-place predicate** (semantics) *kiss* is the set of ordered pairs of individuals where the first individual stands in a kissing relation

to the second. John kissed Mary will be true just in case the pair John and Mary are in the set of ordered pairs of individuals where the first individual kisses the second one.

two-place predicate : *kiss*  
transitive verb



a set of ordered pairs of individuals

*John is kissing Mary*

true iff the pair John and Mary is a member of a set of ordered pairs of individuals such that the first member (John) kisses the second (Mary)

To sum up, words and phrases refer to a variety of things in the world: objects and relations between individuals. Now, what is the meaning of sentences? How do sentences refer? Simple declarative sentences are taken to express certain assumptions about reality, and if we understand sentences correctly, we are able to say whether these assumptions are true or false.

THE REFERENCE OF A SENTENCE IS ITS TRUTH VALUE

Let's take a simple declarative sentence like

*The lights are on.*

Suppose that you are in the situation in which the lights are on, just like right now here in this lecture room. Suppose you did not know whether the sentence *The lights are on* is true or false in this situation (assuming that you can see). Could you say that you know what this sentence means? I think not. One way to determine whether you understand this sentence, is to see whether you are able to determine under which circumstances this sentence is true or false. This knowledge is semantic, constitutive of our knowledge of what sentences mean.

What is expressed by a sentence like *The lights are on* is true in a situation in which the lights are on. It is false in a situation in which the lights are off. Sentences may vary in their truth value from utterance occasion to utterance occasion. The same point can be made for any simple declarative sentence.

In giving the above example of what the meaning of a simple declarative sentence might be, we made a certain choice. The choice is that the study of linguistic meanings can be based on the notion of ‘truth’. Sentences denote their truth value. A referential theory of semantics that is based on the notion of ‘truth’ in this way, is called the **truth-conditional theory of semantics**.

Since the notion ‘true’ is here used to indicate something like “corresponding to the way the world is,” **truth-conditional theory of semantics** assumes a *correspondence theory* of truth (see Dowty et al. 1981:4).<sup>2</sup>

We can perfectly understand a sentence like

---

<sup>2</sup> We take simple declarative sentences as the point of departure. Other sentence types, like questions, commands or exclamations seem to be somehow derivative.

*Mary stood close to John*

without checking, or even being able to check, whether this sentence is true or not. Although we may not know what the facts actually are, we do know what the facts ought to be in order to make this sentence true. What would the facts have to be like in order for this sentence to be true? This sentence would be true just in case a person named by *Mary* and another person named by *John* stand in a certain spatial relation to one another named by the words *close to* at some time that is prior to the present moment 'now'.

A truth-conditional theory of semantics obeys the following dictum:

To know the meaning of a (declarative) sentence is to know *what the world would have to be like* for the sentence to be true. To give the meaning of a sentence is to specify its truth conditions, i.e., to give necessary and sufficient conditions for the truth of that sentence.

The point is not to provide effective criteria for checking the truth of sentences. Certainly, we can understand a sentence like *Water is chemically a compound of hydrogen and oxygen* without having to go to a lab and do the relevant chemical tests. It is not part of semantics to determine when particular sentences are actually true or false about the actual real world. It is not part of semantics to determine whether Einstein's theory of relativity or Newton's theory of mechanics is a correct theory about the world. How do we know whether something is true? In philosophy, this is studied by the **theory of knowledge** or **epistemology**.

Let us consider the following sentences

- (i) I am the tallest person in the world.
- (ii) Mary believes that I am the tallest person in the world.

To specify the truth conditions for a sentence like (i), we need to consider the referential value of the pronoun *I* and specify that the person named by this pronoun is taller than anybody else in the world. The facts are such that there are people who are taller than I am, hence (i) is false.

In order to specify the truth conditions for a sentence like (ii), we need to consider a world that corresponds to Mary's beliefs and in that world it holds that I am the tallest person in the world. Clearly, (ii) can be true even if in fact I am not the tallest person in the world. (ii) contains a **world-creating verb** 'believe', such verbs are also known as 'epistemic verbs' or verbs of 'propositional attitude', because they express an attitude towards the content of what is expressed by the clause embedded under them.

Mary's belief world is one possible world, one way in which the world could have been otherwise than it is. David Lewis (1973, p.84) coined the term 'possible world' for such a world. As David Lewis puts it,

“[t]here are many ways things could have been besides the way they actually are. On the face of it, this sentence is an existential quantification. It says that there exist many entities of a certain description, to wit, ‘ways things could have been.’ I believe permissible paraphrase of what I believe; taking the paraphrase at its face value, I therefore believe in the existence of entities which might be called ‘ways things could have been’. I prefer to call them ‘possible worlds’”.

David Lewis (1973, p.84)

Truth-conditional semantics that is enriched with possible worlds is called **intensional semantics**. The semantics of a variety of intensional expressions, like world-creating verbs and conditional sentences will be formulated in terms of reference here and now in the actual world, but also in terms of reference to other possible worlds, worlds at other indices than here and now.

The “world” is intended to refer to the vast complex of things, situations and facts that words or sentences can be “about”. A particular world--one of all the possible worlds--is to contain everything that could affect the truth value of some sentence, i.e., everything that a sentence can be about. The intuitive significance of a possible world is that of a complete specification of how things are, or might be, down to the finest semantically relevant detail. (Note that it is important to use the technical term a “possible world”, rather than terms like a “state-of-affairs” or a “situation” , because the latter are less comprehensive or detailed notions than “possible world”. A state-of-affairs or a situation may concern only some aspects of the world. A particular sentence, after all, is about only a small part of the world. Thus, a state-of-affairs or a situation which makes a sentence true amounts to what is common to all those worlds in which the sentence is true. (See also Kratzer “Lumps of Thought”.)

Worlds can be construed in terms of abstract mathematical entities called **models**. The theory of semantics that assumes models is called **model-theoretic semantics**. A model (structure) is the kinds of things that are needed to interpret expressions in a language. An interpretation in the sense of a model-theoretic theory of semantics, is some way of assigning meanings or denotations to expressions in a language with respect to a certain model (structure). Model-theoretic semantics is a particular implementation of the semantic program of truth-conditional semantics. This class is essentially an introduction to model-theoretic semantics.

Let us now consider the following conditional sentences:

conditional sentences

- (i) hypothetical: If it rains tomorrow, that will be 25 days of rain in one month.
- (ii) counterfactual: If Proust had travelled on *Titanic*, and had died when *Titanic* sank, *Remembrance of Things Past* would not have been completed.

In order to specify the truth conditions for If it rains tomorrow, that will be 25 days of rain in one month, we need to imagine a possible future world located tomorrow, in which it rains. Such conditional sentences are called **hypothetical conditional sentences**.

To specify the truth conditions for If Proust had travelled on *Titanic*, *Remembrance of Things Past* would not have been completed, we need to imagine a **possible world** which was exactly like the one at the time of the *Titanic* cruise, but in which contrary to the facts Proust was also among the passengers on *Titanic* and perished. Such conditional sentences are called **counterfactual conditional sentences**.

Even if we move into the realm of possible world semantics or intensional semantics, and talk about possible worlds that correspond to somebody's beliefs, it does not mean that the representations in a referential theory theory of meaning have psychological import, that they model in some psychologically real sense the minds of language users, or their psychological grasp of meaning in language. The referential theory of meaning is not intended to be psychologically realistic.

## 1.2.2 Mentalistic, cognitive and conceptual theories of meaning

There is a variety of mentalistic, or cognitive and conceptual semantic theories that are concerned with speakers' psychological grasp of the meanings of expressions of their language, rather than with the relation between expressions and the (possible) world(s), as abstract mathematical objects, as in referential theories of meaning. What matters is how the world is presented, the projected world, the world construed by means of linguistic expressions. Emphasis is on the way in which our reports about reality are influenced by the conceptual structures inherent in our language.

The basic assumption of cognitive semantics is that meanings are represented in our mind in a representation format that has its own rules and interacts with other human capabilities, such as visual perception and drawing logical inferences. In most general terms, the goal of cognitive and conceptual types of semantic theories is to relate linguistic expressions to their cognitive representations.

Cognitive and conceptual semantic theories arose partly as a critique of formal semantics and were partly inspired by certain developments in the field of cognitive science in the 1970's: mainly psychology, artificial intelligence, computer science and anthropology. In linguistics, there have been developed various forms, as represented in the work of

Charles Fillmore (U of C at Berkeley, ICSI Berkeley)  
Ray Jackendoff (Brown University)  
George Lakoff (U of C at Berkeley)  
Ronald Langacker (U of C at San Diego)  
Leonard Talmy (State University of New York, Buffalo)  
Anna Wierzbicka (Australian National U)

**(a very short list, there are many more people that could be listed here!)**

One of the topics that cognitive and conceptual semantic theories are concerned with are words that describe concepts that have no clear category boundaries and whose members do not have an equal status. For example, take a simple word like CHAIR. There are versions of truth-conditional semantics in which the characterization of its meaning would involve at least the following assumptions:

- (i) characterization of the meaning in terms of a conjunction (of a fixed set) of necessary and sufficient conditions. For example:

A given object counts as a CHAIR iff it is (a) a piece of furniture (b) for one person (c) to sit on, (d) having a back and (e) four legs.

These five conditions could then be taken as being *individually necessary* for the definition of the category the word CHAIR labels. If any of the defining features is not exhibited by the entity, then the entity is not a member of the category. *Jointly*, the two features are *sufficient*; any entity which exhibits each of the defining features is a member of the category.

- (ii) All necessary and sufficient conditions are binary (can take only one of two values: + or -): e.g., [+ a piece of furniture] or [- a piece of furniture]. They all have an equal status in defining members of a given category. Having a back is no less and no more important than having four legs.
- (iii) Categories have clear boundaries. A category, once established, divides the universe into two sets of entities, those that are members of the category, and those that are not.
- (iv) All members of a category have an equal status, and all non-members of a category have equal status.

(i) – (iv) are problematic: There certainly are kitchen chairs that satisfy all the above necessary and sufficient conditions. However, there are things in the world that we talk about as chairs even though they satisfy only some of the above necessary and sufficient

conditions. For example: office chairs often have five legs, and not four, and still count as chairs. Beanbag chairs have no legs and no backs. Dentist chairs have no legs, and you often do not sit in it, but rather lie on it. Barber chairs are not meant just for sitting but for sitting and having your hair cut, your face shaved, etc. And electric chairs are not just for sitting either.

Even such a short sampling of things that we call ‘chairs’ indicates that some of these things are better examples of the category ‘chair’ like kitchen chairs and some are less good examples like dentist chairs and some are very marginal examples like beanbag chairs and electric chairs.

It may be proposed that words like CHAIR are categorized around good, clear exemplars like KITCHEN CHAIRS, and that these good exemplars or PROTOTYPES serve as reference points for the categorization of not so clear instances. (See the work of William Labov and Eleanor Rosch in the 1970s.) Moreover, members of the category labeled by CHAIR can be graded in terms of their typicality. Membership in a prototype category is a matter of gradience.

Even concepts whose boundaries can be scientifically defined exhibit this type of graded membership. The famous example is the word *bird*. Even assuming that English speakers all think of birds as

‘warm-blooded, egg-laying, feathered vertebrae with forelimbs modified to form wings’ (the dictionary definition),

we still feel that some of these creatures are more bird-like than others. Thus, robins and magpies, for example, are intuitively better examples of birds than are hummingbirds, ostriches, or penguins. Therefore, the mental image of the word *bird* will probably more

closely resemble to its most prototypical representative a robin, rather than to an atypical bird like a penguin.

Many words label categories whose boundaries are fuzzy. RICH is an example. While some people clearly qualify as rich and others uncontroversially as nonrich, an indefinitely large number of people fall into the unclear area at the borderline of the concept and it is just not possible to say definitively whether or not they count as rich. This is because the notion of ‘richness’ does not have clear-cut boundaries; it is what we call a **fuzzy concept** (see *Fuzzy Logic* of Lotfi Zadeh, a professor at U of C at Berkeley, Computer Science Department).

Other examples of words that label fuzzy categories/concepts: *tall, old, playboy, strong, grey-haired, genius, clean, bargain.*

Since much of the work in conceptual/cognitive linguistics is concerned with categorization, as reflected in linguistic categories, both in its methodology and in its substance it is directly related to work done in psychology. “If linguistics can be said to be any one thing it is the study of categories: that is, the study of how language translates meaning into sound through the categorization of reality into discrete units and set of units” (Labov 1973:342).

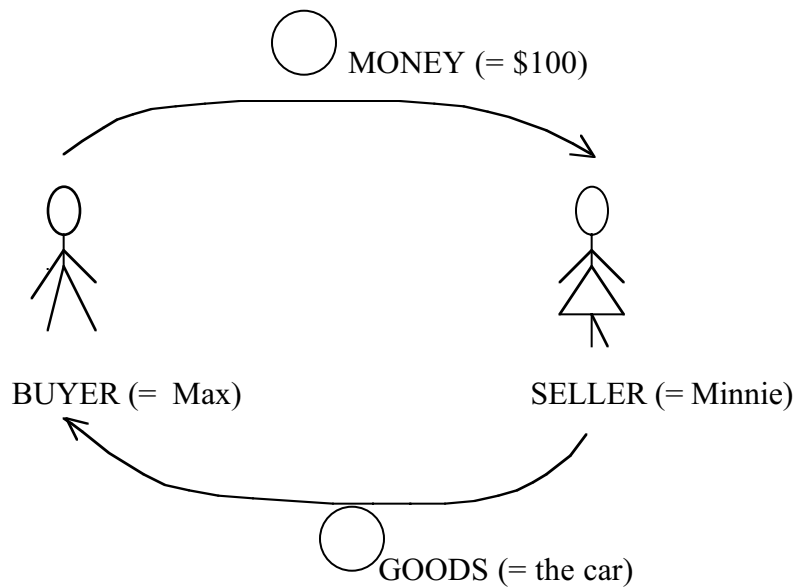
One important part of the work done in conceptual/cognitive linguistics is inspired by the assumption that Charles Fillmore expresses as follows: words and other linguistic units up to the sentence level are interpreted against the background of FRAMES. Fillmore introduced the notion of a ‘frame’ in (1975).

A **frame** is a script-like (conceptual) structure of inferences, linked by linguistic convention to the meanings of linguistic units, including individual lexical items. Each frame identifies a set of frame elements (FEs) - participants and props in the

frame. A frame semantic description of a lexical item identifies the frames which underlie a given meaning and specifies the ways in which FEs, and constellations of FEs, are realized in structures headed by the word.

Example: **Commerical Transaction Frame**

Within what we might call the **commercial transaction frame**, which is associated with verbs like *buy*, *sell*, *pay*, *bribe*, *cost*, *blackmail*, and several others, we can distinguish the BUYER, the SELLER, the GOODS and the MONEY.



Such a simple COMMERCIAL TRANSACTION FRAME underlies the use of sentences like the following ones:

- a. Minnie sold the car to Max for a hundred dollars.
- b. Max bought the car from Minnie for a hundred dollars.
- c. Max paid a hundred dollars to Minnie for the car.
- d. Max paid Minnie a hundred dollars for the car.

In the following examples, we find the same frame-specific participant roles, but the different verbs license different realizations of these roles in the surface structure. For example, the buyer Minnie is realized as the subject of the verb *sold* in a. and in the PP when the verb is *bought*, as in b. The buyer Max is realized as the subject of the verbs *bought* and *paid* in (b) to (d). The goods, the car is realized as the direct object of the verb *sold* and *bought*, but it is backgrounded in the PP when the verb is *paid*.

SELL frame-specific participant role grammatical function	<u>Minnie</u> seller subject	car goods DO	\$100 money PP-for	<u>Max</u> buyer PP-to
BUY frame-specific participant role grammatical function	<u>Max</u> buyer subject	car goods DO	\$100 money PP-for	<u>Minnie</u> seller PP-from
PAY frame-specific participant role grammatical function	<u>Max</u> buyer subject	\$100 money DO	<u>Minnie</u> seller PP-to	car goods PP-for

Fillmore’s notion of ‘frame’ roughly corresponds to the notion of a ‘prototype’ or ‘exemplar’, as it was discussed here in connection with the work of Wittgenstein, Rosch, Labov, Berlin&Kay’s research on color terms, and others. “Linguistically encoded categories (not just words and fixed phrases, but also various kinds of grammatical features and syntactic patterns) presuppose particular structured understandings of cultural institutions, beliefs about the world, shared experiences, standard or familiar ways of doing things and ways of seeing things. Lexical items can be seen as serving discriminating, situating, classifying, or naming functions, or perhaps merely a category-acknowledging function, within, or against the background of, such structures” (Fillmore 1985:231-2).

Another example: **ORPHAN**

The meaning of ‘orphan’ can be characterized as a child whose parents are no longer living, and we may understand this meaning as being also motivated against the background of a particular kind: children depend on their parents for care and guidance. A person without parents has a special status, for society, only up to a particular age, because during this period a society needs to provide some special way of providing care and instructions.

What about the Menendez brothers (Lyle and Eric) who were on trial for the murder of their parents? One of the brothers was a minor when he he committed the murders.

“The category ORPHAN does not have ‘built into it’ any specification of the age after which it is no longer relevant to speak of somebody as an orphan, because that understanding is a part of the background prototype; a boy in his twenties is generally regarded as being able to take care of himself and to have passed the age where the main guidance is expected to come from his family. It is that background information which determines the fact that the word ORPHAN would not be appropriately used of such a boy, rather than information that is to be separately built into a description of the word’s meaning. In the prototype situation, an orphan is seen as somebody deserving of pity and concern.” (Fillmore 1982b:118). The prototype scene against which society has a reason to categorize some children as orphans does not take into account the case in which a child orphans itself.

Therefore, we would not apply the word ‘orphans’ to the Menendez brothers. Notice also that it would be very difficult (or is even impossible) to capture all of the above assumptions that constitute the orphan prototype (or frame) within a referential theory of meaning. No matter how much we would ‘tweak’ the necessary and sufficient

conditions for the truth of a statement like “X is an orphan iff ... “, the prototype assumptions would be difficult, and perhaps impossible, to be captured in this format.

Problems for cognitive/conceptual semantics:

(a) Cognitive or mental representations of certain types of words can be thought of as a mental image or idea formed by someone who understands it. This seems to be pretty straightforward for many nouns denoting concrete entities like people or objects. However, there are many words like *only*, *just*, and also negation, complex NP's like *at most three*, quantifiers, among other things, that cannot be (easily) represented within cognitive/conceptual semantics.

(b) Problematic is also the definition of mental operations which build complex concepts out of atomic ones in order to be able to assign a meaning to a whole sentence.