

Sense and Reference

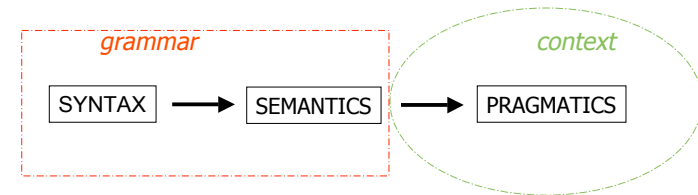
Foundations of Semantics

LING 130

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Thanks to Dan Wedgewood of U. Edinburgh for use of some slides

A picture of the grammar



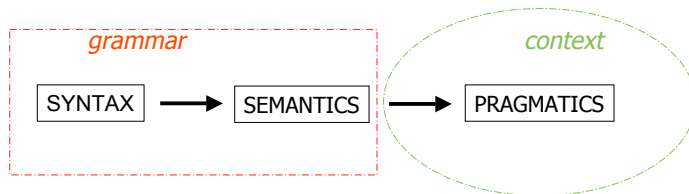
But remember what we had to do to get from linguistically encoded meaning to the proposition expressed:

- Assign reference

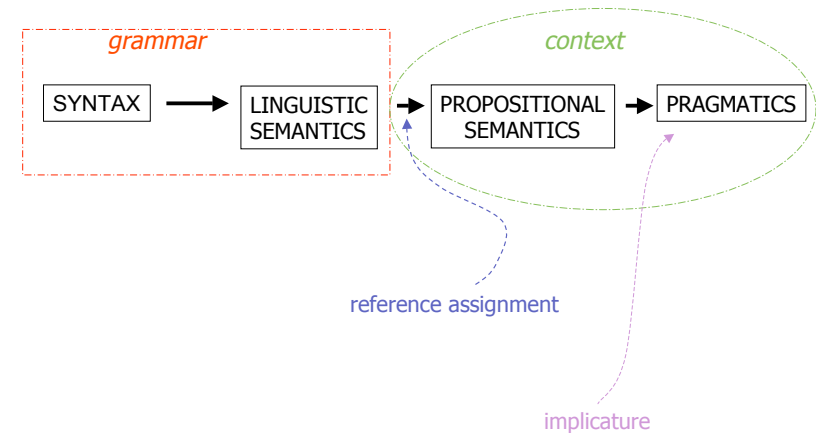
Norman talked to her in the bedroom.

Norman Bates talked to the mother of Norman Bates in the master bedroom of Norman Bates' house.

A picture of the grammar



A revised picture



Kinds of meaning

dog (*n.*): domesticated, four-legged
carnivorous mammal of the species
canis familiaris

- Two kinds of definition here

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 1. listing essential **properties**

Kinds of meaning

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- Two kinds of definition here:
 1. listing essential **properties**
 2. stating membership of a **class**

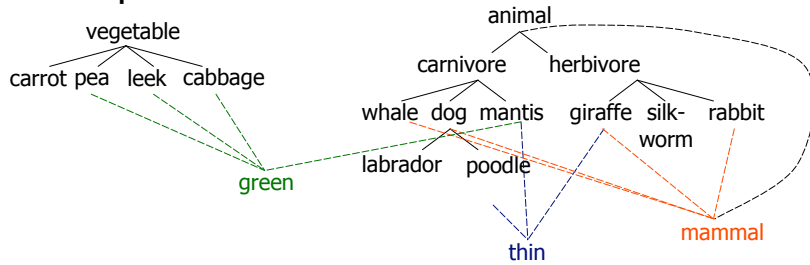
Kinds of meaning

dog (*n.*): domesticated, four-legged
carnivorous mammal of the species
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- In fact, stating properties also assigns
an entity to a class or classes:
- *domesticated things, 4-legged things,
carnivores, mammals...*

Properties and sense

On the other hand, properties determine relationships between linguistic expressions:



Sense and denotation

So we have two kinds of meaning, which look like “two sides of the same coin”:

- The entity / class of entities that an expression picks out
- The relationships between expressions *within the language*

Sense and denotation

So we have two kinds of meaning, which look like “two sides of the same coin”:

- The entity / class of entities that an expression picks out **DENOTATION**
- The relationships between expressions *within the language* **SENSE**

Sense

The **sense** of a linguistic expression: the sum total of all of its *sense-relations* with other parts of the linguistic system

Recall

- synonymy, antonymy, hyponymy...
- paraphrase, contradiction, entailment

Denotation and reference

A further distinction on the side of “what’s picked out in the world”:

- **Reference** occurs in context, as a result of using *referring expressions*
- **Denotation** can be used (also) for what other expressions pick out, independently of context

dog : *denotes* the class of dogs

my dog : used to *refer to* a particular dog

Sense and denotation

Sense and denotation are interdependent:

- you can’t normally know one without knowing the other
- ...and in a partly inverse relationship:
- The broader the denotation, the fewer detailed sense relations

e.g.

animal : broader denotation, less detailed sense

dog : narrower denotation, more detailed sense

Sense and denotation

Though closely connected, these are two significantly different ways of approaching a theory of meaning

- We will be concentrating on denotation
- connects to the truth-conditional view of meaning

Extension and intension

Extension: sometimes equated with denotation, but contrasts with...

Intension:

- The *defining* property of an expression
- the ‘dogginess’ of *dog*, the ‘redness’ of *red*, the ‘runningness’ of *run*, etc

Extensional and intensional denotation

You can pick out entities or classes of entities...

...or you can pick out a defining property

- Both are kinds of denoting

Extensional and intensional denotation

But what is it to pick out a 'defining property'?

- This isn't obviously 'something in the world'
- Perhaps more like a **concept** – i.e. a mental object, not an external one
- An important connection between extension and intension:

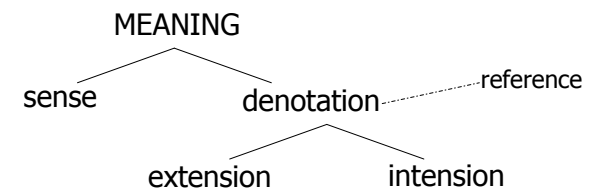
Intentions determine extensions

Intentions and sense

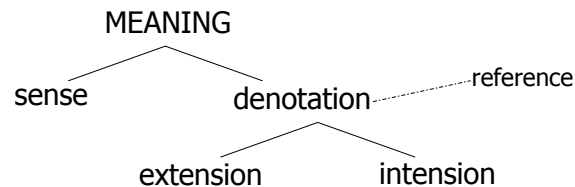
Intentions and sense are clearly connected:

- both are concerned with properties
- hence some analysts conflate the two terms
- In fact, there's a lot of terminological variation out there

The whole schema



The whole schema



Referential theories

- Truth-conditional semantics is based in a kind of 'referential theory' (or extensional theory) of meaning
- referential theories of meaning have had a bad press...

Some problems for referential theories

- function words? *the, of, 's*
- Don't have extensions themselves
- But we can deal with them in terms of their effects on the truth-conditions of complex expressions

Some problems for referential theories

- function words?
- non-existent 'entities' – unicorns, etc.
- same extension, different concept?
the morning star versus *the evening star*
- these do show the need for intensions

Some problems for referential theories

- function words?
- non-existent 'entities' – unicorns, etc.
- same extension, different concept
- verbs?
- No individual entity to point at
But extensions aren't only individuals...

Predicates

Predicates denote properties
Extensionally, this means sets

Predicates

We've said that some words denote a class of entities: e.g. *dog*

Let's make this more concrete:

dog denotes the **set** of all dogs in the world

Likewise:

run denotes the set of all running entities

red denotes the set of all red entities

Nouns as predicates

Common nouns are semantically predicates

- recall that determiners can turn them into referring expressions (picking out entities):

my dog, the sandwich

- 'predicative use' of common nouns:

Snuffles is a dog.

- Needs no copula *be* in many languages:

Mari gyerek 'Mari is a child' (Hungarian)

Juma mpishi 'Juma is a cook.' (Swahili)

Predicates and arguments

If predicates are sets, **predication is locating an entity in a set**

John runs

John is in the set of running things

The kettle is broken

The kettle is in the set of broken things

The boy is a genius

The boy is in the set of things (people) that are geniuses

Set theory and extension

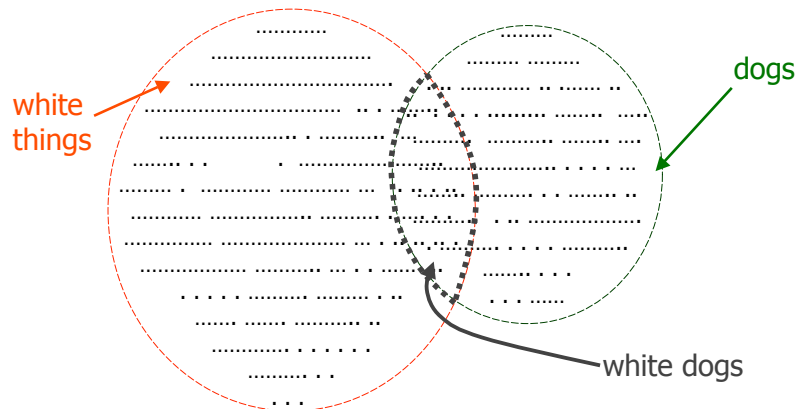
We can now use mathematical set theory to understand how meaning is built up compositionally:

- predication is the relation 'is a member of'
- complex predicates can be interpreted as *set intersections*:

a white dog 'one of the members of the intersection of the set of white things and things that are dogs'

Combining predicates

- complex predicates as *set intersections*:



The truth about cats and dogs

This way of composing extensions gives a way to relate linguistic structure to truth conditions

Snuffles is a white dog is true *if and only if* (iff)

'Snuffles is a white dog' is true

The truth about cats and dogs

This way of composing extensions gives a way to relate linguistic structure to truth conditions:

Snuffles is a white dog is true *if and only if* (iff)

$DOG(Snuffles) \ \& \ WHITE(Snuffles)$

is true

The truth about cats and dogs

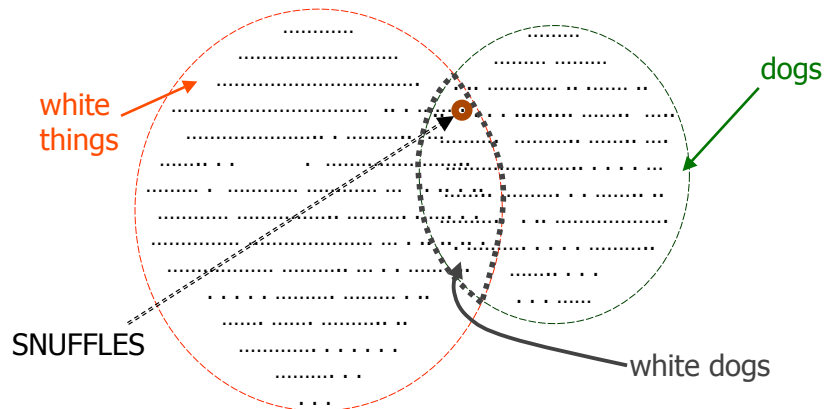
This way of composing extensions gives a way to relate linguistic structure to truth conditions:

Snuffles is a white dog is true *if and only if* (iff)

Snuffles is a member of the intersection of the set of white things and the set of dogs

Combining predicates

(*Snuffles is a white dog* is true)



Summary

- Terminology: Sense, denotation, extension, intension, reference
- Using sets to compose extensional meanings
- Predication as set membership
- Truth conditions tested against set-theoretic extensions

Oh but

- Things are so much more complex.
- But let's start with a simple model.