Varieties of meaning
http://www-rohan.sdsu.edu/~gawron/semantics

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Outline

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What is semantics?

Definition

Semantics Semantics is the study of the **meaning of linguistic forms**, what the words and the syntax contribute to what is communicated.

Literal meaning

We call the meaning of a linguistic form its literal meaning.

- Sentence   Literal meaning

  I forgot the paper   Past forget(I, the paper)

  At some time in the past, someone forgets something [forget(,)] The speaker is the someone. The paper is the something.

  Each part of the sentence contributes something to this literal meaning.

I	*the speaker of the utterance*
the paper	*an object appropriately describable as a paper*
forget	*the relation that holds between an individual and something they forget*
*Past Tense (*ed*)*	*the relation holds in the past*

Semantics and pragmatics

- Literal meaning excludes a lot of what might actually be communicated on a particular occasion of utterance.
- Pragmatics is the study of how literal meaning and context are used by cooperative speakers and hearers to communicate.

What's communicated

Semantics + Pragmatics = What's communicated.

What's communicated I

(1)   a. I forgot the paper.
       b. Past forget(I, the paper).

- Context
  1. Sunday morning Anna goes out to buy croissants and the local newspaper around the corner at a local convenience store
  2. She returns and utters (1a) to Frances her flatmate.
- What's communicated to Frances
  1. Anna forgot to buy a copy of the local newspaper.
  2. The time of the forgetting is the time interval of her shopping expedition [she knew she intended to buy the paper when she started; she knows it now.]
  3. Anna intends to go back out and get the paper.

Work for Pragmatics

(2)   a. I forgot the paper.
       b. Past forget(I, the paper).

There are many facts communicated which are not part of the literal meaning

Not part of literal meaning

(a)   The fact that it's Anna who's done the forgetting
(b)   The fact that the forgetting happened during a particular time interval
(c)   The fact that it's BUYING the paper that was forgotten (as opposed to stealing or reading or packing)
(d)   The facts that it's a newspaper
(e)   The fact that it's a COPY of the newspaper

What's communicated II

(3)   a. I forgot the paper.
      b. Past forget(I, the paper).

- The context
  1. A body has been found murdered in the fields near a farm house
  2. Scrap of wallpaper found on shoe indicates some connection to farmhouse with recent wallpaper work.
  3. Detective Inspector Dalgleish speculates to Detective Sergeant Alcott that the murder may be unrelated to the events in the farmhouse, then utters (3a).
- What's communicated to D.S. Alcott
  1. The detective forgot the connection between the wallpaper on the victim's shoe and the farmhouse.
  2. The time of the forgetting was the time interval of the previous utterance.
  3. Speculation withdrawn: What I just said must be wrong.

(4) a. I forgot the paper.
     b. Past forget(I, the paper).

There are many facts communicated which are not part of the literal meaning

Not part of literal meaning

(a) The fact that it's the detective who's done the forgetting
(b) The fact that the time interval of the forgetting was the detective's immediately preceding utterance
(c) The fact that it's the connection between the farmhouse and the wallpaper on the victim's shoe that was forgotten
(d) The fact that it's wallpaper
(e) The fact that the detective intends to retract his previous speculation.

Differences in what's communicated

Differences

Who's forgetting

What's forgotten

Time interval of forgetting

Referent of *the paper*

Communicative purpose (intent to make another trip, intent to retract previous statement)

Semantic/pragmatics: summary

- Semantics + Pragmatics = what's communicated in context
- Semantics is concerned with the literal meanings of linguistic forms [which is independent of context????]
- Although what's communicated by utterances of a sentence varies from context to context, the literal meaning of the sentence does not [this is the right idea, but it will take some work to spell this out]

Pragmatics [Right definition]

Pragmatics studies how context and literal meaning determine what's communicated

Part of literal meaning I

Entailment

(a)	John is taller than Mary
(b)	Mary is shorter than John
	Sentence (a) entails sentence (b)
(c)	Andrew Wiles proved Fermat's Last Theorem.
(d)	Someone proved Fermat's Last Theorem
	Sentence (c) entails sentence (d)

If (a) is true, then (b) must be true [in any context]. If (c) is true, then (d) is true [in any context]. Notice you don't have to know anythinng about the facts to have these intuitions.

Part of literal meaning II

Presupposition

(a) The mathematician who proved Goldbach's Conjecture is a woman.
(b) Goldbach's conjecture has been proved.

If (a) is true, then (b) must be true.

Sentence (b) is a presupposition of sentence (a). Presuppositions are a special case of entailment.

Why are presuppositions special?

If p is a presuposition of sentence A, p is an entailment of the negation of sentence A:

Negation

(a)   The mathematician who proved Goldbach's Conjecture is a woman.
(b)   The mathematician who proved Goldbach's Conjecture is not a woman.
(c)   Goldbach's Conjecture has been proved.

If (a) or (b) is true, (c) is true.

Ordinary entailments and negation

(d)   Andrew Wiles proved Fermat's Last Theorem.
(e)   Andrew Wiles did not prove Fermat's Last Theorem.
(f)   Someone proved Fermat's Last Theorem

Only (d) entails (f).

Parts of pragmatics

To be taken up later

Implicature

Implicatures are propositions distinct from literal meaning or entailments whose truth can be inferred based on the literal meaning and context by use of general principles of cooperation in communication (Informativeness and Relevance).

Indexicality

Certain expressions vary their function from context to context based exclusively on features of the speech situation (*I*, *here*, *there*). These are called indexicals.

Implicature is context bound

Alice: Do you love me?

Bob: I'm very fond of you.

Observations:

Implicature is context bound

Alice: Do you love me?
Bob: I'm very fond of you.

Observations:

a. The implicature is cancellable: In fact, I love you!
b. It is an interesting semantic property of *love* and *fondness* that they denote emotions that seem to fall on a scale (of intensity?)
like < is fond of < love

Outline

Sense

Following the text, we'll use the term sense as a rough synonym of meaning.

Denotation

Following the text, we'll say that the denotation of an expression is the part of the world described on a particular occasion of use.

Kearns on denotation

"A long standing and influential view about language is that the meaningfulness of language amounts to its 'aboutness'. Words and expressions symbolize and describe — and thus are about — things in the world." [p. 6]

Sense determines denotation

An expression like *the president* uttered today denotes a particular individual in the world, Barack Obama.

Uttered in 2007, it denoted George Bush.

Uttered in 1993 it denoted Bill Clinton.

The **denotation** of the expression *the president*, has changed.

But the **sense** hasn't.

We say the **sense** determines the **denotation**. (to be modified below).

Denotation: Definition?

Other kinds of linguistic expressions besides NPs have 'aboutness.' We use the term denotation for all kinds of expressions: the part of reality the expression picks out is its denotation.

Expression	Type	Denotation
the cat	NP	a particular feline entity, say, Garfield, the one referred to on this occasion of utterance
cat	Noun	a set of animals, all of them felines
dog	Noun	a set of animals, all of them canines
walk	Verb	a set of actions, entailing movement and use of the legs
pass the salt	VP	a set of actions, entailing a quantity of salt be involved

Outline

Time of utterance

We said above sense determines denotation.

This can't be quite right.

First of all the expression *the president* denotes different persons on different occasions of use.

So it's at least the case that sense + time of utterance determines the denotation. In other words, at least one other thing besides the sense is required to determine the denotation.

Discourse Context

The following sentence is perfectly fine, even I utter it right now:

> *In the summer of 1862 the war was going badly. The president knew...*

And here sure as heck the expression *the president* uttered right now can denote Abraham Lincoln.

So the time of the presidency we are talking about is NOT necessarily tied to the time of utterance. Sometimes context can fill in the time of the presidency we are talking about. [Is this a special property of the KIND of text I'm assuming?]

Linguistic context I

Of course context has been filling more stuff than time in all the examples we've been talking about:

1. the president of the United States of America/ of Zaire.

Linguistic context I

Of course context has been filling more stuff than time in all the examples we've been talking about:

1. the president of the United States of America/ of Zaire.
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Linguistic context I

Of course context has been filling more stuff than time in all the examples we've been talking about:

1. the president of the United States of America/ of Zaire.
2. the president of General Motors

All along we understood ourselves to be talking about the president of the U.S., but we can make that linguistically explicit if we want, or even choose a different organizational entity for the president to be president of.

Linguistic Context II

We can also make the time explicit:

1. the president of the United States of America in 1862
2. the president of General Motors in 1960
3. the president of the United States of America in 1860

Linguistic context differs from discourse context is that the information is supplied by material in the same sentence.

Conversational context

I enter the house and say

> *The dog is gone.*

My wife knows which dog I mean because of shared knowledge. I will refer to such shared knowledge in a conversation as the conversational context. It differs from a discourse context is that it does not depend on any previously uttered sentences.

A better formula

(Sense + Discourse Context + Linguistic Context + Conversational context) **determines** *Denotation*

Different sense / Same denotation

Expressions with very different senses can have the same denotations and this is largely unpredictable linguistically, because it has to do with the weird and wonderful way the world turned out.

Some expressions with different senses and identical denotations:

The Boston Red Sox	*the winner of the 2004 World Series*
Barack Obama	*the president of the U.S. in 2013*
the United States	*the U.S.*
the president of the United States in 2005	*the president of the U.S. in 2005*
the morning star	*Venus*
the evening star	*Venus*
the morning star	*the evening star*
Mr. Universe 1970	*the governor of California 2005*

Denotation: The right concept?

The preceding examples should pretty much have convinced you that denotations as we have defined them can't be meanings. Denotations vary at the whim of the electorate and the Gods of baseball, but meanings shouldn't.

Consider *dog* again. We said its denotation is:

> *a set of animals, all of them canines*

Yet we don't want a theory that says the meaning of the word *dog* changes whenever a puppy is born...

We are going to assume two kinds of denotations, called **extensions** and **intensions.**

Intension/extension

We're going to call denotations the way we've been thinking about them so far *extensions* because they are what is covered or picked out the world by an expression *given the way the world is*.

But we've established that extensions can't be used as senses.

We're going to model sense with a new idea: intensions.

The intension of *dog*

Consider *dog*. At any instant of time there is a certain set of individuals that is the set of dogs. If the world were only *slightly* different than it is, there would be a slightly different set of dogs.

Thus the denotation depends not only on the sense but also on the *way the world is*, or as we shall say, on *what world we are in*.

So our theoretical construct is this: there is a set of worlds we call **the set all possible worlds**, and the denotation of *dog* varies from world to world:

Denotation of *dog*

w_1	Fido, Bowser, Argus, Rex
w_2	Bowser, Argus, Rex
w_3	Fido, Argus, Rex
w_4	Ashes, Bowser, Argus, Rex

Summary

World	Extension
w_1	{ Fido, Bowser, Argus, Rex }
w_2	{ Bowser, Argus, Rex }
w_3	{ Fido, Argus, Rex }
w_4	{ Ashes, Bowser, Argus, Rex }

Idea	Model	Notation
intension of *dog*	the above table	$[\![\text{dog}]\!]$
extension of *dog* at w_3	3rd line of table	$[\![\text{dog}]\!]^{w_3}$

Why 4 worlds?

These examples are incomplete. The set of all possible worlds really needs to cover all **possible** ways the world might differ from the way it is. With respect to the word *dog* the set of possible worlds needs to provide us with all possible individuals that might be a dog, and at least one world for each distinct possible set of dogs. That's a lot of worlds....

Outline

Extensions for sentences

We need a theory of semantics that covers all expressions, not just nouns and verbs. In particular, sentences should have extensions and intensions. Let's start with extensions.

What should the extension of a sentence be?

Leibniz's law

Substitution of Identicals

Replacing an expression E with another expression E' *with the same extension* does not change the extension of the larger expressions in which E occurs.

Example

(a)   1970   =   the year of the great tsunami
(b)   the governor of California 1970
(c)   the governor of California the year of the great tsunami

(b), (c) have the same extension because (c) is the result of substituting *the year of the great tsunami* for *1970* in (b); and *the year of the great tsunami* has the same extension as *1970*.

Using Leibniz's Law

Assumption: A sentence is a complex expression with an extension, so Leibniz's law applies.

Substitution of identicals

1. The governor of California in 2005 = Mr. Universe 1970 = Arnold Schwarzenegger
2. The governor of California in 2005 is grinning.
3. Arnold Schwarzenegger is grinning.
4. Mr. Universe 1970 is grinning.

According to Leibniz's Law, the extensions of all three sentences should be the same.

But what is it that stays the same? Not the meaning. In a world in which Mr Universe 1970 and the governor of California 2005 weren't the same guy, sentences (2) and (4) might have different truth-values. So they can't have the same meaning.

Truth-value

One thing that remains the same: Truth-value

1. The governor of California in 2005 is grinning.

Truth-value

One thing that remains the same: Truth-value

1. The governor of California in 2005 is grinning.
2. Arnold Schwarzenegger is grinning.

Truth-value

One thing that remains the same: Truth-value

1. The governor of California in 2005 is grinning.
2. Arnold Schwarzenegger is grinning.
3. Mr. Universe 1970 is grinning.

Frege's idea I

It is **the truth-value of a sentence** that functions like a denotation . It is **the truth-value of a sentence** that stays the same when expressions with identical denotations are substituted into it.

There are 2 truth-values: True and False.

So the **denotation** of a sentence should be a truth-value (either true or false).

Of course there are many sentences that denote **True**, just as there many noun phrases that denote Barack Obama.

And there are many sentences that denote **False**.

And the denotation of a sentence may change just as the denotation of *the president* may change. *John is eating* may denote **True** at 10:01 A. M. and **False** at 10:02 A. M.

Outline

Intensions for sentences

We decided that the **the truth-value of a sentence** is its extension, because it is **the truth-value of a sentence** that stays the same when expressions with identical denotations are substituted into it. [Frege's argument]

So for Frege the **extension** of a sentence will be a truth-value (either true or false); and therefore the intension will be a table that tells us the truth value in each world.

Three intensions

Example

$$\left[\!\!\left[\begin{array}{l} Arnold \\ Schwarzenegger \end{array}\right]\!\!\right] \quad \left[\!\!\left[\begin{array}{l} the\ governor \\ of\ CA\ 2005 \end{array}\right]\!\!\right] \quad \left[\!\!\left[\begin{array}{l} Mr.\ Universe \\ 1970 \end{array}\right]\!\!\right]$$

w_1	Arnold
w_2	Arnold
w_3	Arnold
w_4	Arnold

w_1	Arnold
w_2	Gray
w_3	Cruz
w_4	Arnold

w_1	Arnold
w_2	Brett
w_3	Steve
w_4	Arnold

The extensions of all 3 expressions are equal in w_1, differ in w_3.

$$\begin{array}{lllll}
[\![\text{A. Schwarzenegger}]\!]^{w_1} & = & [\![\text{the gov. of CA}]\!]^{w_1} & = & [\![\text{Mr. Uni 1970}]\!]^{w_1} \\
[\![\text{A. Schwarzenegger}]\!]^{w_3} & \neq & [\![\text{the gov. of CA}]\!]^{w_3} & \neq & [\![\text{Mr. Uni 1970}]\!]^{w_3} \\
[\![\text{A. Schwarzenegger}]\!] & \neq & [\![\text{the gov. of CA}]\!] & \neq & [\![\text{Mr. Uni 1970}]\!]
\end{array}$$

VP denotation

And suppose that this is the way it is with grinning in our 4 worlds:

Intension of *grin*

w_1	{ Arnold, Cruz, Gray, Steve, Brett }
w_2	{ Arnold, Cruz, Gray, Steve }
w_3	{ Arnold, Gray, Brett, Steve }
w_4	{ Cruz, Gray, Steve, Brett }

Sentence intensions

Having fixed the intensions of the three NPs and the VP *grins*, we have:

Example

$$\left[\!\!\left[\begin{array}{l} \text{A. Schwarzenegger} \\ \text{grins} \end{array}\right]\!\!\right] \qquad \left[\!\!\left[\begin{array}{l} \text{The governor of} \\ \text{CA 2005 grins} \end{array}\right]\!\!\right] \qquad \left[\!\!\left[\begin{array}{l} \text{Mr. Universe} \\ \text{1970 grins} \end{array}\right]\!\!\right]$$

w_1	true
w_2	true
w_3	true
w_4	false

w_1	true
w_2	true
w_3	false
w_4	false

w_1	true
w_2	false
w_3	true
w_4	false

Since all three subjects denote Arnold in w_1, either all 3 sentences are true or all 3 are false in w_1 (Leibniz's Law). Same goes for w_4. As it happens, in w_1 Arnold is grinning and in w_4, he is not; so all 3 sentences are true in w_1 and all 3 are false in w_4.

Set of possible worlds

I differ slightly from the text in saying that intension of a sentence is a table giving the truth value at each world. The text just says the intension of a sentence is the **set of possible worlds at which the sentence is true**. These ideas are equivalent: You can construct the table from the set, and vice versa.

When Leibniz's law fails

Intensional contexts

⟦2 + 2 = 4⟧	=	True
⟦Chester Arthur was the 21st president⟧	=	True
⟦Mark Gawron believes 2 + 2 = 4⟧	=	True
⟦Mark Gawron believes Chester Arthur was the 21st president⟧	=	??

Example

If sentence denotations are truth values, then according to Leibniz's Law, this is not what we'd expect! So in this case we need to make reference to the **other** kind of denotation: intension. Leibniz'z Law becomes: When expressions with the same intension are substituted in a larger expression, the intension of the larger expression remains the same. Do *2 + 2 = 4* and Chester Arthur was the 21st president have the same intension? Contexts in which Leibniz's Law holds only for intensions are called **intensional contexts.**

Summarizing intension/extension

1. Problem: If denotations were limited to extensions, we wouldn't have a model of meaning. Extensions aren't fine-grained enough to model meanings (*George Washington* and *the first president* have the same extensions).

2. Solution: Model meaning with a second kind of denotation: Intensions. An intension is a table (a function) that tracks changes in denotation across possible worlds.

3. Intensions also seem to be necessary in order to account for intensional contexts.

Extensions/denotations and Intensions/senses

1. For our purposes in this course, when we talk about denotation, we will mostly be talking about *extensions*.

2. What we referred to as **the extension of stallion** (⟦stallion⟧) in the lexical semantics lecture is the same as what we're calling extension here. The extension of a noun is the set of things it's true of.

Outline

1. Chapter 1 proposes an answer to the question "What is semantics?"
2. Semantics + Pragmatics = What is Communicated
3. There are aspects to meaning: sense and denotation
4. We use intensions to model senses, and extensions to model meanings.

Extensions

Expression	Type	Extension
the cat	NP	a particular feline entity, say, Garfield, the one referred to on this occasion of utterance
cat	Noun	a set of animals, all of them felines
dog	Noun	a set of animals, all of them canines
walk	Verb	the set of walkers
passes the salt	VP	the set of entities passing the salt
president of the U.S. in 1864	Nominal phrase	the set of presidents of the U.S. in 1864 (one member set)

Denotations independent of context?

You decide!

I am hungry.
That is Fred.
That is very large.
The bar is across the street.
The train station is nearby.
He left last Tuesday.
He had left on the previous Tuesday.
The dog is hungry.

Remember: The contribution of context is part of pragmatics!

Literal meaning:Not pragmatics