Tutorial ‘Introduction to Semantic Theory’ (No. 4)

Cooperative speaker and conversational implicatures

C&MG ch. 4.4-4.5

Zeqi Zhao

Session 8

Jan 17, 2020

Our agenda today

- Recap of last session

- Something new: Semantics vs. pragmatics, Assertion, Grice's Theory of Conversational Implicatures: quality and relevance

- Some exercise to help you with assignment 9

Key concepts you must understand

- Our new semantic system is ***intensional***. In other words:

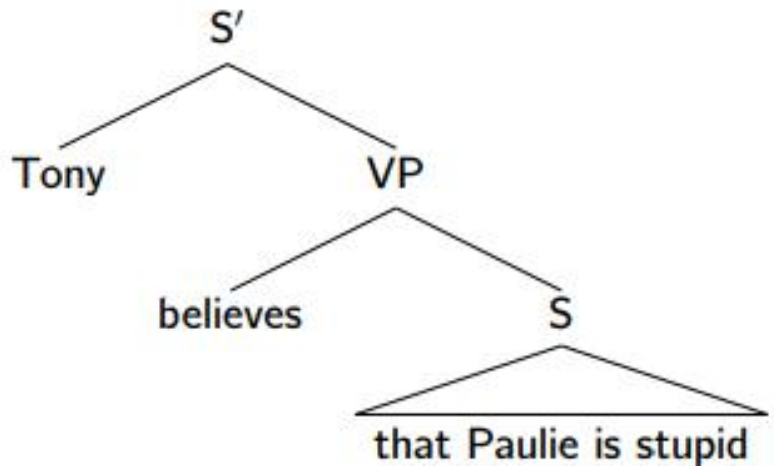
Our new system needs to account for operators that "displace" the evaluation of their complements from the actual here and now to other points of reference (spatially, temporally, and **modally**). For this lecture, we only focus on attitude predicates like "believe", "hope".

- **Intension** is a function (with domain W) which maps every possible world to the extension of α in that world.

$$[\![\alpha]\!]_{\not w} := \lambda \mathrm{w}.\ [\![\alpha]\!]^{w}$$

- **Proposition *p*** is the intension of sentences. *p* is of the type *<s,t>.*

The power of type-driven semantics



[[believes]]^{w} is a function: Proposition S of type <s,t> → A function VP from an individual (the belief holder) <e> to a truth-value <t>.

[[believes]]^{w} should be of type <<s,t>,<e,t>>.

To understand “believe”

What then are beliefs? Intuitively, beliefs represent ways that things are, according to the belief holder. Our beliefs simply leave too many questions unsettled.
For example, right now Tony doesn't know what kind of person Paulie is. The best he can do is have ***a set of candidates*** $W_T^{\mathcal{B}}$ for the actual world *w*:

w_1: Paulie is smart in w_1. $W_T^{\mathcal{B}}$
w_2: Paulie is stupid in w_2.
w_3: Paulie is not stupid in w_3.
.....

If Tony believes that Paulie is stupid, this means w_1 and w_3 must be excluded from Tony's set of candidate worlds $W_T^{\mathcal{B}}$. We say, w_1 and w_3 are not **compatible** with what Tony believes in the actual world *w*.

Lexical entry of *believe*

The truth conditions of a belief report can thus be stated as in (5):

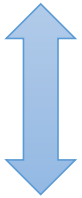
(5) [[Tony believes *p*]]^w= 1 iff every possible world *w′* of Tony's set of candidates $W_T^{\mathcal{B}}$ is compatible with what x believes in *w.*

$$[\![\text{believe}]\!]^w = \lambda p_{\langle s,t\rangle} .\ [\lambda x_e\ .\ \forall w'[w' \text{ is compatible with what } x \text{ believes in } w \rightarrow p(w') = 1]]$$

Accessibility relation

When every possible *w'* in the set of candidates worlds is compatible with what x believes in *w,* we say the worlds are **accessible** given x's beliefs in *w*.

$$[\![\textbf{believe}]\!]^w = \lambda p_{\langle s,t\rangle}.\ [\lambda x_e\ .\ \forall w'[w' \text{ is compatible with what } x \text{ believes in } w \rightarrow p(w') = 1]]$$



$$[\![\textbf{believe}]\!]^w = \lambda p_{\langle s,t\rangle}.\ [\lambda x_e\ .\ \forall w'[w\mathcal{R}_x^{\mathcal{B}}w' \rightarrow p(w') = 1]]$$

Semantics vs. Pragmatics

Semantics: The sentence meaning (propostions)

Pragmatics: The speaker meaning. In other words, what happens when the sentence is **uttered**?

Extra-linguistic factors: contextual factors, conventions are observed in conversation, common ground...

The question to start with: What the speaker intends to convey with uttering a sentence?

“Believing” and utterance: The speaker's beliefs

The attitude of “believing” stands in the center of our pragmatics theory. Consider the sentence in (1):

(1) **Moore’s paradox:**

A: Who won the game?

B: # John won the game. I don't believe John won the game.

The sentence is pragmaticly contradictory. Normally, **speakers** don't utter a declarative sentence ***assertively*** if they don't believe it.

“Believing” and utterance: Forming the addressee's attitude

(2) A: Tell me something about the game.

B: # John won the game, but that’s irrelevant to our discussion

By uttering (2), B intends to make A believe John won the game.

Otherwise, there is no point of uttering (2) at all.

Assertive speech act

For assertive speech acts:

- The speaker msut believe ‘that *p*’

- The speaker intents to forms the addressee's attitude towards ‘that *p*’

Before making any conclusions, let's take a step back first.

Do we have to believe everything we say? e.g., lie.

The Co-operative Principle

In everyday conversation, we have **the default assumption** that:
Our interlocutors are **co-operative**. Like us, they want to use language to communicate as efficiently and rationally as possible.

Based on this intuition, Grice proposed that human conversation is guided by the general principle of cooperation:

(3) The Co-operative Principle(PoC)
Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

The Maxims of Conversation

This cooperative principle is an umbrella term that contains mainly 4 conversational maxims:

(4) The Maxims of Conversation

The maxim of quality (truthfulness)

The maxim of quantity (informativeness)

The maxim of relation (relevance)

The maxims of manner (perspicuity)

The Maxims of Conversation

This cooperative principle is an umbrella term that contains mainly 4 conversational maxims:

(4) The Maxims of Conversation

The maxim of quality (truthfulness)

The maxim of quantity (informativeness)

The maxim of relevance (“relevance”)

The maxims of manner (perspicuity)

The Maxim of quality

The Maxims of Quality

i. Do not assert what you believe to be false

ii. Do not assert that for which you lack adequate evidence

(5) It is raining.

Assume a conversation where the addressee *a* believes the speaker *s* to be a **cooperative speaker**. It follows that *a* believes *s* to obey **quality.**

B_s^w (λ*w′* . It is raining in *w′*) (quality)

= ∀ w' [w' is compatible with what s believes in w → It is raining in *w′*]

The Maxim of relevance

How to define *relevant*?

Recall what we derived for assertive speech acts:

- The speaker msut believe ‘that *p*’. (This matches *“Maxim of quality”*)
- The speaker intents to forms the addressee's attitude towards ‘that *p*’

The speaker only has the intention to produce a certain opinion about *p* in the addressee when the addressee is ***unopinionated*** about *p***.**

(Un-)opinionatedness and relevance

(6) A: John did not win the game.

B: # John won the game.

(6) is odd because A is opinionated about *p*, i.e. A already knows the answer to the question whether John won the game or not. This information is now **irrelevant** to the discussion.

<u>Definition of relevance</u>

For *p* to be relevant, at least one discourse participant must be unopinionated about *p*, i.e., not know the answer to the question whether is *p* true in *w* or not.

(Un-)opinionatedness and relevance

(7) A: Did John win the game?
B: John won the game.

A uttered *Did John win the game*? in a conversation in *w*. This means, A is unopinionated about *p* that *John won the game*. A believes neither *p* nor *p*'s negation. $\neg B_x^w(p) \wedge \neg B_x^w(\neg p)$

Therefore, [λ*w*'. John won the game in *w'*] is relevant (relevance)

Closure of relevance under negation

(8) A: Did John win the game?
B: John didn't win the game.

Is the negation of *p* in (8) relevant? The answer is yes.

p: [λw'. John didn't win the game in *w′*]

¬*p:* [λw'. John won the game in *w′*]

A is unopinonated about p iff x does not know the answer to the question -p. It is clearly the case in (8).

Therefore, [λw'. John didn't win the game in w'] is relevant (Closure of relevance under negation)

A more complex example

However, the current definition we have for relevance is problematic. Consider (9):

(9) A: Did John win the game?

B: $_{p}$[John didn't win the game] and $_{q}$[he went home.]

A uttered a question about *p* in a conversation.

[λw'. John won the game in w'] relevant (relevance)

$_{p}$[λw'. John didn't win the game in w'] relevant (closure under negation)

There is nothing in A's utterance that would make *q* relevant. But our intuition tells us B's answer is perfectly fine.

Closure of relevance under conjunction

Recall the **entailment relationship** of conjunction:

p	q	$p \wedge q$
1	0	0
0	1	0
1	1	1
0	0	0

$p \wedge q$ entails p.

Information about p is always contained in $p \wedge q$. A is unopinonated about -p *eintails* A is unopinonated about - $p \wedge q$.

Therefore, p $\wedge$ q is relevant (closure under conjunction)

This mathces our intuitions.

Modifying “relevance”

To summarize what we observed in (9):
p is relevant. *p* ∧ *q* entails *p.* Therefore, *p* ∧ *q* is also relevant.

Cases like (9) with conjunction indicates that our old definition for relevance is too “naive” to include the entailment relation.

Modified definition of relevance with entailment:

p is relevant iff there is at least one discourse participant x and one proposition *q* such that *x* is unopinionated wrt. the question Is *q* true in *w*? and *p* entails *q*.

Problems remains unsolved

However, this modified version is still not perfect. Consider (10):

(10) A: Did John win the game?

B: *(pointing at John who is sitting next to them in the bar and drinking heavily)* Well, I've never seen him so frustrated before.

A uttered a question about *p.* [λw'. John won the game in w'] relevant (relevance)

B's reply expresses *q* [λw'. John is extremely frustrated in w']. Given our modified definition of relevance, since *q* dosen't entail *p*, *q* should be irrelevant.

But the conversation in (10) is not odd at all. Why?

Contextual entailment

We can explain (10) with the help of **contextual entailment.**

General background knowledge and **the context c** entail a number of things:

- Like most people, John would get upset and frustrated if he doesn't win a game.
- Drinking heavily in bar can be seen as a way of processing one's frustration.

It is assumed that A and B are both cooperative speakers. They should obey *relevance*. Therefore, B won't utter something totally irrelevant.

- if John didn't win the game, he would feel extremely frustrated and only then.

Therefore, *q* [λw'. John is extremely frustrated in w'] **contextually entails** John didn't win the game. *q* is relevant.

Broadening relevance with contextual entailment

For any context *c*, world *w*, and proposition *p*, *p* is relevant in *c* if there is at least one discourse participant *x* and one proposition *q* such that *x* is unopinionated wrt. the question Is *q* true in *w*? and *p* *contextually entails* *q*.

What makes *p* relevant?

To summarize:

- The broadened notion of relevance **with contextual entailment and**
- Different kinds of **closure requirements** (conjunction, negation...) on relevance

can make a certain *p* relevant.

What is important for this course (and assignment 9):

Make a Judgement about the relevance and prove it using the two notions above.

Exercise 19a: Disjunction and relevance

Consider the conversation in (11).

(11) A: Where is Bill now? At home? In his office? Maybe in the gym?
B: Bill is at home or in his office.

a. Simply give your assumption: What propositions are made relevant by A's question?

Exercise 19a: Solutions

By uttering the question in (11), A intends to get information about Bill's current location between 3 options: At home, in his office and in the gym. This means, A is unopinonated about the question where Bill is.

A's question makes (at least) the following propositions relevant:

p: [λw'. Bill is at home in w']
q: [λw'. Bill is in his office w']
r: [λw'. Bill is in the gym in w']

Exercise 19b: Disjunction and relevance

Consider the conversation in (11).

(11) A: Where is Bill now? At home? In his office? Maybe in the gym?
B: Bill is at home or in his office.

b. Does B's reply seem natural to you, i.e. is B's reply relevant given your intuitions?

Exercise 19c: Disjunction and relevance

Consider the conversation in (11).

(11) A: Where is Bill now? At home? In his office? Maybe in the gym?
B: Bill is at home or in his office.

c. If B's reply is relevant to you, try to account for the relevance first using the broadened notion of relevance **with contextual entailment.**

Exercise 19c: Hints

B's reply is a disjunctive statement p ∨ q. Unlikes p∧q, p ∨ q does not entail p, q and p∧q. **p∧q eintails p ∨ q, but not *vice versa***.

p	q	$p \wedge q$	$p \vee q$
1	0	0	1
0	1	0	1
1	1	1	1
0	0	0	0

General background knowledge and the context entails:

- Bill is a person. A person can not be at the two places at once and nowhere at all.
- B is assumed to be a cooperative speaker. By quality, B believes Bill is at home or in his office as far as B knows and nothing else.

Can contextual entailment account for the relevance in (11)?

Exercise 19c: Disjunction and relevance

Consider the conversation in (11).

(11) A: Where is Bill now? At home? In his office? Maybe in the gym?
B: Bill is at home or in his office.

c. Now try to account for the relevance here using the closure requirements on relevance.

Exercise 19c: Hints

p: [λw'. Bill is at home in w'] relevant
q: [λw'. Bill is in his office w'] relevant (relevance)

¬*p*: ¬[λw'. Bill is at home in w'] relevant
¬*q*: ¬[λw'. Bill is in his office w'] relevant (closure under negation)

¬*p* ⋀ ¬*q:* ¬[λw'. Bill is at home in w'] ⋀ ¬ [λw'. Bill is in his office w'] relevant

(closure under conjunction)

Exercise 19c: Hints

Hints: De Morgan's laws: $(P \wedge Q) \equiv \neg(\neg P \vee \neg Q)$,
$(P \vee Q) \equiv \neg(\neg P \wedge \neg Q)$.

I will provide only one of the ways to prove it.

$\neg p \wedge \neg q$ *relevant* (closure under conjunction)

$\neg (\neg p \wedge \neg q)$ *relevant* (closure under negation)

$p \vee q$ relevant (De Morgan's laws)

cf. Gamut 1991 chapter 2

	1	2	3	4	5	6	7
	p	q	$\neg p$	$\neg q$	$\neg p \wedge \neg q$	$\neg(\neg p \wedge \neg q)$	$p \vee q$
V_1	1	1	0	0	0	1	1
V_2	1	0	0	1	0	1	1
V_3	0	1	1	0	0	1	1
V_4	0	0	1	1	1	0	0