

LSA.311: Lecture 8

Kai von Fintel

Massachusetts Institute of Technology

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The Plan for Today

- Quick primer to intensional semantics (toy alert!)
- Introducing indexicals: *I*, *here*, *now*, *actually*
- The need for double-indexing
- The absence of certain operators

Extensions and Intensions

- A sentence ϕ has as its *extension* at a world a truth-value:
 - $\llbracket \phi \rrbracket^w = 1$ or 0
- A sentence has as its *intension* a function from worlds to truth-values:
 - $\lambda w. \llbracket \phi \rrbracket^w$ (Notation: $\llbracket \phi \rrbracket_{\mathfrak{C}}$)

Truth of an utterance

- An utterance of a sentence ϕ in world w is true if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w) = 1$ and false if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w) = 0$.

Extensional Composition

- Most functions expressed by natural language expressions are *extensional*
- They just need to apply to the extension of their arguments
- $\llbracket \alpha\beta \rrbracket_{\mathfrak{C}} = \lambda w. (\llbracket \alpha \rrbracket^w (\llbracket \beta \rrbracket^w))$

Intensional Composition

- Some functions are *intensional*
- They need to apply to the intension of their arguments
- $[[\alpha\beta]]_{\mathfrak{C}} = \lambda w. ([[\alpha]^w ([[\beta]_{\mathfrak{C}}]])$

Might

- Joe might be in Cambridge
- might (Joe in Cambridge)
- $\llbracket \text{Joe in Cambridge} \rrbracket^w = 1$ iff Joe is in Cambridge in w
- $\llbracket \text{Joe in Cambridge} \rrbracket_{\text{c}} = \lambda w. \text{ Joe is in Cambridge in } w$
- $\llbracket \text{might} \rrbracket^w = \lambda \phi. \exists w' \text{ accessible from } w : \phi(w') = 1$
- $\llbracket \text{might (Joe in Cambridge)} \rrbracket^w = 1$ iff $\exists w' \text{ accessible from } w : \text{Joe is in Cambridge in } w'$.

Adding time and tense

- Joe was in Cambridge
- PAST (Joe in Cambridge)
- $\llbracket \text{Joe in Cambridge} \rrbracket^{w,t} = 1$ iff Joe is in Cambridge in w at t .
- $\llbracket \text{Joe in Cambridge} \rrbracket_{\mathfrak{C}} = \lambda w, t. \text{ Joe is in Cambridge in } w \text{ at } t$.
- $\llbracket \text{PAST} \rrbracket^{w,t} = \lambda \phi. \exists t' \text{ prior to } t : \phi(w, t') = 1$
- $\llbracket \text{PAST (Joe in Cambridge)} \rrbracket^{w,t} = 1$ iff $\exists t' \text{ prior to } t : \text{Joe is in Cambridge in } w \text{ at } t'$.

Truth of an utterance

- An utterance of a sentence ϕ in world w at t is true if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t) = 1$ and false if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t) = 0$.

Adding /

- I am in Cambridge.
- What is $\llbracket I \rrbracket^{w,t}$?
- the individual who is speaking in w at t ?
- But there are other people speaking at the same time as me ...

Adding a speaker parameter

- $\llbracket \phi \rrbracket^{w,t,s}$
- $\llbracket I \rrbracket^{w,t,s} = s$
- $\llbracket I \text{ in Cambridge} \rrbracket_{\mathfrak{C}} = \lambda w, t, s. s \text{ is in Cambridge in } w \text{ at } t.$

Truth of an utterance

- An utterance of a sentence ϕ by s in world w at t is true if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, s) = 1$ and false if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, s) = 0$.

Adding *here*

- Joe is here.
- No need to posit a place parameter
- $\llbracket \text{here} \rrbracket^{w,t,s} = \text{the place where } s \text{ is in } w \text{ at } t$

I am here

- $\llbracket \text{I in here} \rrbracket_{\mathfrak{C}} = \lambda w, t, s. s \text{ is, in } w \text{ at } t, \text{ in the place where } s \text{ is in } w \text{ at } t.$
- Tautological

I am not here

- $\llbracket \text{not (I in here)} \rrbracket_{\mathfrak{C}} = \lambda w, t, s. s \text{ is, in } w \text{ at } t, \text{ not in the place where } s \text{ is in } w \text{ at } t.$
- Contradiction
- Answering Machine:
 - I am not here right now

I didn't have to be here

- Or: I might not have been here.
- There is an accessible world w' where s is, at t , **not** in the place where s is in w' at t .
- Just as contradictory as *I am not here*

Solution: add place parameter

- $\llbracket \phi \rrbracket^{w,t,s,p}$
- An utterance of a sentence ϕ by s in world w at t in place p is true if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, s, p) = 1$ and false if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, s, p) = 0$.
- $\llbracket \text{here} \rrbracket^{w,t,s,p} = p$

The *here* sentences again

- $\llbracket I \text{ in here} \rrbracket_{\mathfrak{C}} = \lambda w, t, s, p. s \text{ is, in } w \text{ at } t, \text{ in place } p.$
 - Not tautological but nobody can utter it without speaking the truth.
- $\llbracket \text{not } (I \text{ in here}) \rrbracket_{\mathfrak{C}} = \lambda w, t, s, p. s \text{ is, in } w \text{ at } t, \text{ not in place } p.$
 - Not a contradiction but nobody can utter it without speaking falsely.
- $\llbracket \text{might } (\text{not } (I \text{ in here})) \rrbracket_{\mathfrak{C}} = \lambda w, t, s, p. \exists w' \text{ accessible from } w : s \text{ is, in } w' \text{ at } t, \text{ not in place } p.$
 - Contingent truth, the way it should be (it depends on what are accessible possibilities)

What was the trick?

- Our initial meaning for *here* was:
 - $\llbracket \text{here} \rrbracket^{w,t,s}$ = the place where s is in w at t
- A modal operator like *might* shifts the world parameter, so *here* refers to where the speaker is at the time of speaking in the “new world”.
- But *here* should always refer to where the speaker **actually** is.
- So, we introduced a new parameter p , which “remembers” where the utterance takes place and is not affected by modal operators.

Class Exercise

- Construct an example with a temporal operator that shows an analogous problem to the modal case, which was:
- I might not have been here.

Wide scope instead?

- We could get the right result in another way:
 - Give *here* wide scope in *I might not have been here*
 - Then, the reference of *here* will not be affected by the modal operator
- Problem:
 - Mary always sends me many things that I never mention to anyone who works **here**.
 - I am usually neither **here** nor where they need me.

Where We Are

- 4 parameters of evaluation
 - world
 - time
 - speaker
 - place of utterance
- The world and time parameter are shifted by intensional operators
- Speaker and place of utterance are “stored” and remain unaffected by intensional operators

Get rid of the speaker?

- $\llbracket I \rrbracket^{w,t,p}$ = the individual located in place p in world w at time t .
- What would *I might not have been here* mean?

Now

- $[[\text{now}]]^{w,t,s,\rho} = t$

Kamp

- Once everyone now alive hadn't been born yet.
- There is at least one time t' in the past of the speech time such that:
 - everyone x s.t. x now alive is s.t. x not born at t'
- What does *now* refer to?
- The time parameter was shifted to the past t' , so that's what *now* would refer to
- But that's wrong
- No scope solution
- Kamp: need to remember speech time

Double-indexing

- two time parameters:
 - the time of the utterance
 - to be remembered even in the scope of temporal operators
 - the “evaluation time”
 - will be shifted by temporal operators
- $\llbracket \text{PAST} \rrbracket^{w,t,t_u,s,p} = \lambda\phi.\exists t' \text{ prior to } t : \phi(w, t', t_u, s, p) = 1$

Actually

- It very well might have been that everyone who is **actually** here was somewhere else instead.
- add world of utterance parameter for *actually* to pick up, no matter how deeply embedded

Simplify

- now that we have world of utterance, time of utterance, and speaker, we can get rid of p
- *here* refers to where the speaker is in the world of utterance at the time of utterance

Where We Are

- 5 parameters
 - utterance parameters
 - world of utterance
 - time of utterance
 - speaker
 - shiftable parameters
 - world of evaluation
 - time of evaluation
- $[[\phi]]^{w,t,w_u,t_u,s}$

Truth of an utterance

- An utterance of a sentence ϕ by s in world w at t is true if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, w, t, s) = 1$ and false if $\llbracket \phi \rrbracket_{\mathfrak{C}}(w, t, w, t, s) = 0$.
- Note:
 - initially both world parameters and both time parameters are set to the utterance values
 - it is only when modal/temporal operators appear that the first two parameters get shifted away

Conspicuous Absence

- Could there be operators that shift the “utterance parameters”?
- Technically: yes
 - Nothing prevents us from shifting the s parameter, for example
 - It’s all a matter of constructing an operator that does it.
 - $\llbracket \text{REVERSE} \rrbracket^{w,t,w_u,t_u,s} = \lambda \phi. \phi(w, t, w_u, t_u, a) = 1$, where a is the person that s is addressing in w_u at t_u .
 - REVERSE I am an idiot
 - = You are an idiot
- Monstrosity!

Next Week

- The Kaplanian Two-Step
- Why?
- Advice: go to Stalnaker's class tomorrow (2:55–4:35)!