24.903 Week #10 – 2022-04-11 + 2022-04-13

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1 Discussion of pset6

1.1 Quantifiers in existential *there*-sentences

We reviewed the data pattern about which quantifiers are acceptable in existential *there*-sentences and which are not. What emerges is that only *symmetric* quantifiers can be the "pivot" of such sentences:

(1) There is/are { no / some / very few / several / many / (at least/most) three / #most / #every / #both / #neither } flaw(s) in your argument.

We speculated that this may be because of the structure of these sentences only making one set (the intersection of the two properties) available to the quantifier, which therefore can only make a cardinality claim.

In Barwise & Cooper 1981, the pioneering paper on natural language quantification I mentioned a few classes ago, a different proposal is made: that all and only quantifiers that are neither reflexive nor irreflexive are acceptable in this construction. But *most* is a counterexample to that proposal.

We discussed *only*, which is acceptable in this construction:

(2) There are only horses in the garden.

But *only* is not symmetric. Again, this would make it a counterexample to the claim that only symmetric quantifiers can occur here, as long *only* is in fact a quantifier in (2). We saw that this is not obviously so. The idea would be that there is covert existential quantification in (2) and that *only* negates alternatives to "some HORSES are in the garden" that replace *horses* with other sets. This would be a similar strategy as the analysis of sentences like *only horses were in front of the mansion* that was developed in von Fintel 1997.

1.2 Quantifiers that license polarity items

The negative polarity item *ever* is not acceptable in simple positive sentences but becomes acceptable when negation is added:

(3) a. #Jodie has ever been to Halifax.

b. ✓Jodie has**n't** ever been to Halifax.

But once we look at quantified sentences, we see that negation isn't really required. We need to distinguish between occurrences of *ever* in the first or the second argument of the quantifier. Hence the use of a relative clause in the crucial examples:

(4) a. No [friend of mine who has ✓ever been to Big Bend]
has ✓ever liked it.

b. Some [friend of mine who has #ever been to Big Bend]
has #ever liked it.

c. Every [friend of mine who has ✓ever been to Big Bend]
has #ever liked it.

The generalization is that *ever* is acceptable in constituents that are downward monotone. *No* is both left and right downward monotone and so *ever* is acceptable in both of its arguments. *Some* is both left and right upward monotone and so *ever* is unacceptable in either of its arguments. *Every* is left downward and right upward monotone, so *ever* is acceptable in its first argument but not in its second.

This discovery (by Giles Fauconnier and Bill Ladusaw in the 1970s) helped solidify the status of semantics as a crucial part of linguistic theory.

We discussed a possible counterexample to the monotonicity analysis: quantifiers of the form *exactly n* seem to make *ever* acceptable:

(5) Exactly three friends of mine who have ✓?ever been to Big Bend ✓?ever liked it.

This is an unsettled problem, on which see for example Rothschild 2006 and Crnič 2014.

2 Quantifiers in non-subject position

(6) Cristiane likes every player.

We are presented with a compositionality puzzle by sentences like (6). Our quantifier meaning for *every* has it compose with two one-place predicates but in (6) it is only getting one: its *second sister* is the two-place predicate *like*. At the same time, *like* is looking for a type e argument but *every player* is of type $\langle et, t\rangle$. So, either way *like* and *every player* cannot combine via FUNCTION APPLICATION or any other composition principle we have on the books.

As before (see our discussion of *foggy town*), we have multiple avenues for solving the puzzle:

- a new composition principle (an option we pursued when we introduced PREDICATE MODIFICATION, but we will not try to go this way this time)
- propose a different syntactic analysis
- explore giving additional "high-type" meanings to one or more expressions

The last option is what pset8 will be about. Here, we develop the syntactic solution.

First though, an intuitive characterization of what any solution needs to achieve. What (6) means can be stated in a paraphrase that has the virtue of making obvious that even in (6) *every* does still specify a relation (the subset relation) between two sets:

(7) Every player is an individual who Cristiane likes.

The second set that *every* operates with is $\{y \in D_e : \text{Cristiane likes } y\}$. Any solution should provide *every* with this set as its second argument.

3 Quantifier Raising

In many recent syntactic frameworks, quantifiers can undergo covert movement in a process called "Quantifier Raising" (aka *QR*). Our sentence in (6) will receive the following structure after QR has occurred:

(8) every player $\boxed{i}$ Cristiane likes t_i

That is, *every player* moves from the object position of *likes* and leaves a trace with an index i. It adjoins to the sentence and an abstractor with the same index, $\boxed{i}$ is inserted.

The second sister of *every* is then also of type $\langle e, t\rangle$ and thus the right kind of argument for the quantifier. We calculate the meaning of the second sister as follows (using ABSTRACTION as the composition principle for the first step):

(9) For any context c, world w,
$[\![\boxed{\text{i}}\ \text{Cristiane likes } t_i]\!]^{c,w}$
$= \lambda x.\ [\![\text{Cristiane likes } t_i]\!]^{c^{x/i},w}$
$= \lambda x.\ [\![\text{likes } t_i]\!]^{c^{x/i},w}([\![\text{Cristiane}]\!]^{c^{x/i},w})$
$= \lambda x.\ [\![\text{likes } t_i]\!]^{c^{x/i},w}(\text{Cristiane})$
$= \lambda x.\ [\![\text{likes}]\!]^{c^{x/i},w}([\![t_i]\!]^{c^{x/i},w})(\text{Cristiane})$
$= \lambda x.\ [\![\text{likes}]\!]^{c^{x/i},w}(x)(\text{Cristiane})$
$= \lambda x.\ [\lambda y_e.\lambda z_e.\ z \text{ likes } y \text{ in } w](x)(\text{Cristiane})$
$= \lambda x.\ [\lambda z_e.\ z \text{ likes } x \text{ in } w](\text{Cristiane})$
$= \lambda x.\ \text{Cristiane likes } x \text{ in } w$

And lo and behold: that is exactly the second argument we said we needed to provide to *every* to get the correct meaning for our sentence.

Question: we moved *every player* out of the position in which it is pronounced to a higher position: the one on top of the sentence. Could we have moved it to another position? Well, there's just one other possibility, namely adjoining to the predicate phrase (*likes* t_i). But note that this constituent is of type $\langle e, t\rangle$ and thus not of the right type to have ABSTRACTION be trig-

gered. So, the structure would not be interpretable. QR needs to adjoin to a constituent of type t.

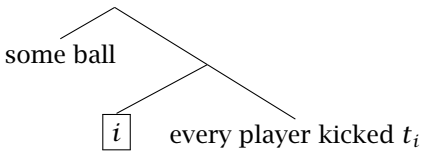
4 Scope ambiguity

(10) Every player kicked some ball.

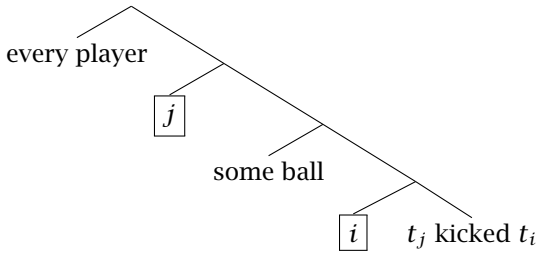
Sentences with two quantifiers are often ambiguous. In the case of (10), there is one reading that claims that there is a ball with the property that every player kicked it, and there's another reading that says that for every player there is some ball, possibly different balls for the different players, that she kicked.

We can derive two readings for (10) by assuming an optionality of the target position of Quantifier Raising.

(11) READING 1



(12) READING 2



Exercise: provide a compositional calculation of the truth-conditions of the two structures.

In class, we didn't discuss this particular example, but the following:

(13) Exactly half the players kicked some ball.

Here, the two interpretations are perhaps more obviously distinct.

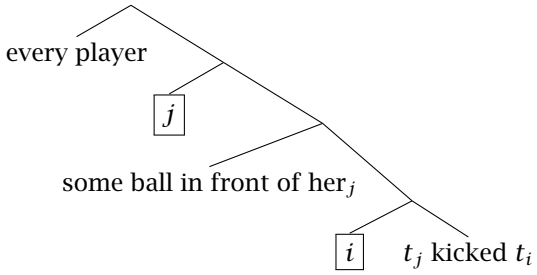
5 A final example and calculation

(14) Every player kicked some ball in front of her.

We observe that under the bound variable reading where the pronoun *her* is bound by *every player*, we only get one reading: that the balls kicked are (possibly, or even probably) different for each player.

This is explained by the fact that in order to bind the pronoun that is in the first argument of *some*, *every player* needs to be higher than *some*.

(15)



Exercise: provide a compositional calculation of the truth-conditions of (15).

References

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