Complementation

PHIL 43916
October 24, 2012

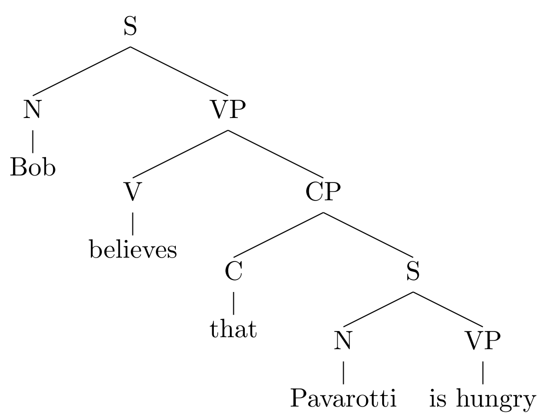
1. Sentence embedding

Consider the sentence

> Bob believes that Pavarotti is hungry.

What is the logical form of this sentence?

A plausible thought is that to answer this question we need to add two new categories to our syntax: the categories of complementizer (C) and complementizer phrase (CP). Using these categories, we might (ignoring tense for now) give the tree for this sentence as



The question is now how we understand the semantics of complementizers like 'that' and verbs like 'believes.'

We are accustomed to treating the semantic values of sentences as truth-values. Suppose that we just treated 'that' as semantically null, and let the semantic value of the CP node be the same as the semantic value of its daughter S node. What would be wrong with this strategy?

A better approach is to treat ‘that’ in the way that we have treated ‘former’, ‘necessarily’, and ‘it was the case that’ — as operating on the intension, rather than the semantic value, of the relevant sentence.

One way to do this is as follows (this differs, but not in substance, from the presentation in the text; and here I’m ignoring the role of time for simplicity):

$$[\![[_{CP} \text{ that S}]]\!]^{M,w,i,g} = f{:}f(w^*)=1 \text{ iff } [\![S]\!]^{M,w^*,i,g}=1\}$$

That is: it is the function from worlds to truth-values which delivers value 1 for each world at which S is true, and 0 otherwise — i.e., S’s intension.

For some purposes, it is more intuitive to think of S’s intention not a function of this sort, but as the set of worlds of which that function is the characteristic function. On this way of doing things, we’d give the rule for ‘that’ as

$$[\![[_{CP} \text{ that S}]]\!]^{M,w,i,g} = \{w^*{:}w^* \in W\ [\![S]\!]^{M,w^*,i^*,g}=1\}$$

Informally: the semantic value of ‘that S’ is the set of worlds at which ‘S’ is true.

How do we combine this with an account of ‘believes’? The idea is that we can model the beliefs of a subject as a set of worlds: it is the set of worlds in which everything that that subject believes is true. So suppose my only beliefs are that South Bend is cold and that Los Angeles is hot. Then my ‘belief set’ is the set of possible worlds in which South Bend is cold and Los Angeles is hot.

Does your belief set include the actual world? Why or why not?

Now consider some sentence

Jeff believes that S

For this to be true, it must be the case that S is true in every world which is a member of my belief set — i.e., it must be true that, for all w $\in$ Jeff’s belief set, $[\![S]\!]^{w}=1$. In other words, there must be no world in which S is false which is compatible with everything I believe.

An interesting consequence of this view of the syntax and semantics of belief (and other attitude) ascriptions concerns its interaction with quantification. Consider the sentence

Jeff believes that a student in PHIL 43916 is a spy.

our rules for the treatment of 'a student' permit us to form two different trees for this sentence. What are they? Do they correspond to a difference in truth conditions? Are there really two interpretations of the above English sentence?

2. Infinitive & gerund embedding

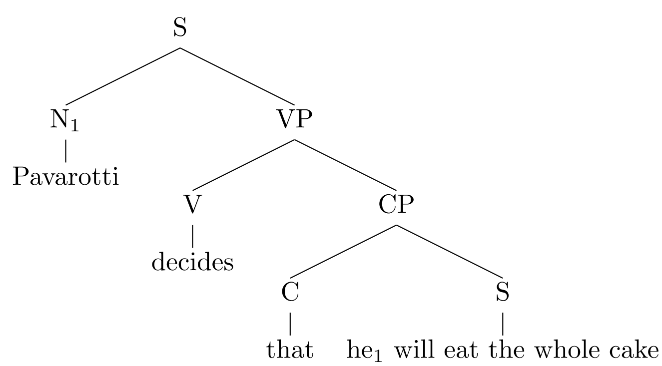
There are some similarities between sentence embedding and embedding of infinitival and gerundive phrases (IG's), as in the followings sentences:

> Pavarotti suggested *eating the whole cake.*
> Pavarotti decided *to eat the whole cake.*

One natural suggestion is that we treat sentences like these as elliptical versions of cases of sentence embedding. So, for example, we might treat the second as elliptical for

> Pavarotti decided that he would each the whole cake

which would have a logical form corresponding to the following tree:



which we could understand using the semantics for 'that' developed above. But this sort of analysis faces a problem. Consider the following argument:

> 1. Pavarotti decided to eat the whole cake.
> 2. Loren decided the same thing Pavarotti decided.
>
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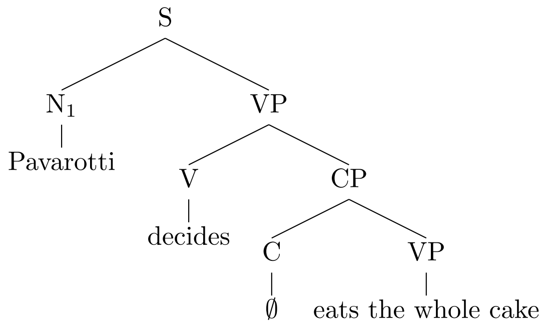
>
> C. Loren decided to eat the whole cake.

Is this argument valid? If so, is this predicted by our analysis?

One way to explain the validity of this argument is to modify our treatment of IG's. Perhaps we should take them to have, not the form described above, but rather something like



where '∅' stands for the 'null complementizer.' How should we understand the semantics of this complementizer?

We can understand them in a way parallel to the way we treated the complementizer 'that' above. Just as ⟦that S⟧ is the intension of S, so the semantic value of the above CP will be the intension of the VP 'eats the whole cake.' What sort of thing will this be?

In general, intensions are functions from worlds and times to semantic values. Since the semantic value of a VP is a set of individuals, the intension of a VP is a function from worlds and times to sets of individuals. Intuitively, it will be a function from a world w and time i to the set of things that eat the whole cake in w at i.

How would this analysis explain the validity of the above argument?

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Brief discussion of the relationship between sentence intensions and propositions, and VP intensions and properties.