

Tense

Jeff Speaks
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1	The operator approach to tense	1
2	Tense and ‘not’	3
3	Problems for the modal operator approach	3
3.1	Tense and negation	3
3.2	Intervals and the present moment	4
3.3	Restricted tenses	4
3.4	Tense and anaphora	5
4	An alternative treatment of tense as involving quantification over times	5

1 THE OPERATOR APPROACH TO TENSE

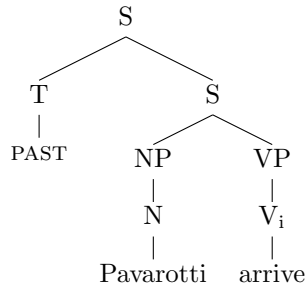
When introducing our intensional logic, we analyzed tense by adding the sentence operators P and F to our language. But there’s an obvious problem with the application of this idea to English since, in English, we most typically express tense not with operators like ‘it will be the case that’ but rather by modifying VPs – e.g., by adding an ‘-ed’ to the end of a word to express the past tense, or by adding ‘will’ before a verb to express the future tense.

This is similar to problems we encountered before, most obviously in our discussion of quantification. Just as we solved problems with the logical form of quantified sentences via the mechanism of quantifier raising, so here we can appeal to ‘tense raising.’

Consider the sentence

Pavarotti arrived.

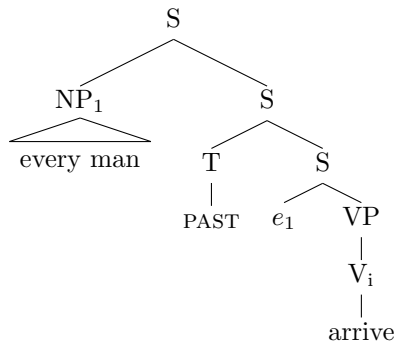
The idea is that we take it to be of the form



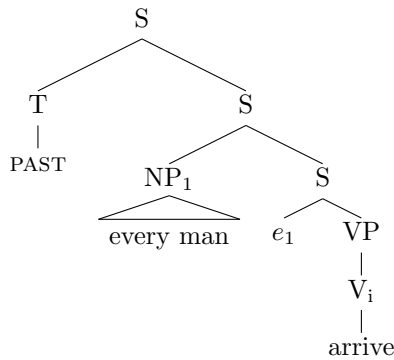
(Note that where tense is involved, the text replaces the syntactic category S with the category TP (tense phrase). Here I stick with the more familiar S; the difference won't matter for our purposes.)

Providing the semantics for this sentence is then just an extension of the semantics provided for F and P in the intensional predicate calculus. As there, we assume that the lexicon assigns intensions to every expression of the language. How would you derive the truth value of the above sentence?

Remember that when we encountered sentences including more than one quantifier, we found that these sentences in many cases had two different truth conditions, depending on the relative scope of the quantifiers. Since we are treating tenses, like quantifiers, as raised, one might wonder whether we encounter the same ambiguity with the interaction of tense and quantification. And we do. Consider 'Every man arrived' and the two trees



and



How would the truth conditions assigned to these trees by our semantics differ?

2 TENSE AND ‘NOT’

It is worth pausing to note a feature of our treatment of tense. We are treating tenses, like quantifiers, as exhibiting movement. Even though in the surface structure tense – spelled out as ‘will’ or ‘-ed’ – occurs as part of the verb phrase, we are assuming that in the logical form tenses, like quantified noun phrases, combine with sentences to form sentences. But, unlike those quantifier phrases, we are not treating tense as leaving behind traces in the logical form.

Once we see this, we can extend our language a bit to handle the normal ways of expressing negation in English. In English, negation is typically expressed by inclusion of ‘not’ in a verb phrase, as in

Pavarotti is not boring.

or by ‘-n’t’, as in

The cat wasn’t cute.

We can treat these constructions in the same way we are now treating tense: as exhibiting movement, and then having the same semantics as we previously assigned to ‘it is not the case that.’

3 PROBLEMS FOR THE MODAL OPERATOR APPROACH

While the sort of analysis of tense we have just laid out is a traditional one, it faces some problems and unanswered questions. We’ll lay some of these out in this section before considering an alternative in the next section.

3.1 *Tense and negation*

Just as the movement of tenses should lead us to expect this sort of interaction between quantification and tense, so it should lead us to expect this sort of interaction between negation and tense. But consider the sentence

Pavarotti did not arrive.

What two trees would correspond to this sentence, presuming that we are continuing to treat negation as a sentence operator? What are the two corresponding truth conditions? Are both genuine readings of the above sentence?

It is puzzling that tense is apparently restricted to take narrow scope with respect to negation; this is the sort of thing which we would like to be able to explain with our theory, rather than just stipulate.

3.2 *Intervals and the present moment*

Using past, present, and future tense operators, can you think how you might analyze sentences like

Pavarotti will be hungry until Bond arrives.

Pavarotti has been hungry since Bond arrived.

These sentences seem to at least require the addition of binary sentence operators (which are syntactically similar to the way we have been treating ‘and’) for ‘until’ and ‘since’. Once we have these we can define PAST and FUT in terms of them, albeit in a somewhat artificial way. (PAST S will be true iff SINCE(S, S or not-S).) How would you write out the lexical entry for ‘until’?

Somewhat different problems are raised by sentences like

It will be the case that everyone who is now alive is dead.

How might you analyze this sentence using the tense operators we have introduced so far? Does this give the right truth conditions?

Could we solve the problem by letting ‘everyone who is now alive’ take wide scope with respect to FUT? Can we test this hypothesis by creating a scope ‘island’ of the sort that we discussed in connection with anaphora?

3.3 *Restricted tenses*

Ordinary use of tense does not seem to operate in quite like the way that our tense operators would suggest. Consider

I was late.

Does this really mean that there is sometime in the past at which I was late? Ordinarily, this sentence would mean that I was late during some specified interval.

Could we solve this problem using ‘until’ or ‘since’?

3.4 Tense and anaphora

Consider the discourse, discussed in the optional reading from King,

Last week, Bob had a party. Annie got drunk.

or

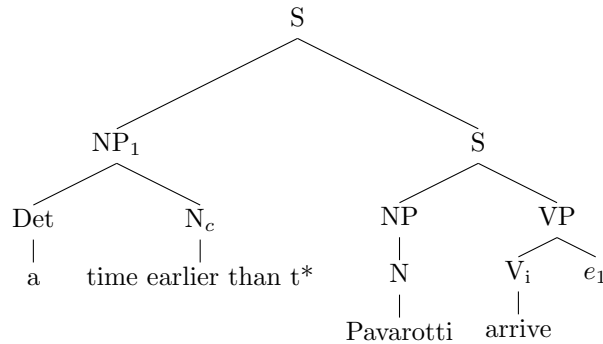
Whenever Pavarotti arrived, Bond left.

The next time Pavarotti arrives, Bond will leave.

It seems as though both involve tense being, in some sense, anaphoric on something. But we have, so far, no way of understanding anaphoric relations between operators; the examples of anaphora that we know how to treat so far all involve NP's. (Though, as we'll see later in the course, there are also VP anaphora.)

4 AN ALTERNATIVE TREATMENT OF TENSE AS INVOLVING QUANTIFICATION OVER TIMES

One way of responding to some of these problems is to treat tense as a device of quantification over times, rather than via temporal operators. On this view, a sentence like 'Pavarotti arrived' might be understood to have a form which, adapted to the framework we have been developing, might look something like



(Here t^* would be the time of the utterance; we'll return to this sort of thing when we discuss context-sensitivity.)

How might one formulate a rule to give us the semantic value of the VP in this tree?

Does this help with some of the cases discussed above?

It is an open question whether the semantics of tense is best handled in terms of operators or in terms of quantification.

...

Tense is a complicated topic, and our discussion has just scratched the surface. Some topics we have not discussed include:

- The way that tense functions inside of quantified NPs.
- The treatment of aspect (e.g., perfective vs imperfective), and its interaction with tense.
- The connection between debates in the metaphysics of time and between debates about the semantics of tense.