A linguistic argument for indeterministic futures

Philosophers since Aristotle have debated whether the future should be treated as deterministic or indeterministic. Although there are good philosophical arguments for indeterminism, for most compositional semantic purposes there has never been a good reason to use indeterministic models, which are more complicated than deterministic ones. In this paper, however, I argue that in some languages, an indeterministic model *must* be used, in order to account for the behavior of future modals under aspectual operators.

Background: If the future is deterministic, then whatever is going to happen, has always been going to happen. There is a fact of the matter about it, even though we don't know what the future is going to be. If, however, the future is indeterministic, there is no fact of the matter yet about what is going to happen tomorrow; it has not been decided yet.

The determined option is markedly easier to implement than the non-determined option. Suppose (subject-internal) VPs are predicates of times (type $\langle$ i,t $\rangle$), with every such predicate a total function from the set of times. The deterministic future operator *Fut₁* can then simply say that the time in question is after the time of utterance, as in (1), for example, with i eventually given the value of the time of utterance through some default mechanism.

The non-determined option introduces some extra complexity. Thomason (1970) defines the notion of history through a time and quantifies over these histories to yield an indeterministic model. I use a variation of his system in the framework of Heim and Kratzer (1998). Histories are type h. Propositions are type $\langle$h,$\langle$i,t$\rangle\rangle$. As in the deterministic version, propositions are defined for all times, on any one history. The difference is that in the indeterministic system, we quantify over all the histories through a particular time. The Thomasonian future operator *Fut₂* is type $\langle$h,$\langle$i,t$\rangle\rangle$,$\langle$i,t$\rangle\rangle$, and does just that, as shown in (2).

Data: Copley (2001) argues that *be going to* has a structure with a progressive over a future modal *woll* (as in (3a)), drawing from Abusch's (1985) treatment of *will* as present tense plus *woll* (as in (3b)). Some of the data leading to that conclusion are the contrasts in (4a,c) and (5a,c), which parallel contrasts between ordinary progressive and simple verbs in English (the b,d examples). The hypothesis can also account for the fact ((6)) that in volunteering contexts, *will* but not *be going to* is acceptable. proposition volunteered will not happen anyway. The (6) examples are treated as consequents of conditionals to which the antecedent is a covert "if you like", but because of the progressive aspect, (6a) can only be a pragmatic conditional, informing the hearer of an already ongoing state of affairs. This results in the unacceptability in the volunteering context, a condition of which is that the volunteered event must not be inevitable.

English is not the only language in which this kind of difference occurs, as shown in (7); the Indonesian future particle *akan* patterns with *will* in one dialect and *be going to* in another.

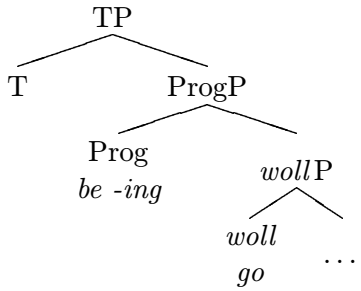
Argument: If we pursue this idea and place *Fut₁* under a progressive operator, as shown in a, it should be truth-conditionally equivalent to (1). This is an unwanted result given all the differences in (4) - (6). For if an interval i precedes an interval k, there will always be an interval j that includes i and precedes k. And as long as the timeline is dense (a necessary assumption for an interval semantics) it will also always be true that for any interval j that precedes k, there will always be an interval i included in j that also precedes k. However, in an intdeterministic system, $[\![$ Fut$_2$ VP $]\!]$(i) can be false at one time, but become true at another. This is because histories are weeded out as they become impossible; cf. $[\![$ Fut$_1$ VP $]\!]$(i), which always has the same truth value.

Whether this argument can apply universally hinges on whether futures in general behave like one or the other forms of the Indonesian future, i.e., either perfectively or imperfectively. I will discuss the extent to which this is true, and point out problems and correlations with other facts.

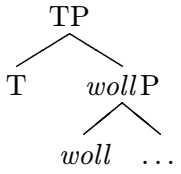
(1) For any time i, ⟦ Fut$_1$ VP ⟧(i) = 1 iff ∃j: i is before j and VP(j)

(2) For any time i, ⟦ Fut$_2$ VP ⟧(i) =
1 if ∀ h, h a history through i: ∃j: i is before j and VP(h)(j);
0 if ∀ h, h a history through i: ¬∃j: i is before j and VP(h)(j);
and is undefined otherwise.

(3) a.



b.



(4) a. Oh, look, it's going to rain.
b. Oh, look, it's raining.
c. #Oh look, it'll rain.
d. *Oh look, it rains.

(5) a. For about an hour, Nomar was going to play the next day.
b. For about an hour, Nomar was playing the next day.
c. * For about an hour, Nomar would play the next day.
d. * For about an hour, Nomar played the next day.

(6) a. We'll change your oil in Madera.
b. # We're going to change your oil in Madera.

(7) Indonesian: Jakarta (J) / non-Jakarta (N) judgments
a. J#/N√ Aduh, hujan akan turun.
Oh.no, rain Fut fall
'Oh no, it will / is going to rain.'
b. J√/N# Saya akan membuat kopi.
I Fut make coffee
'I will / am going to make coffee.' (volunteering context)

(8) a. For any proposition p and time i, ⟦ PROG ⟧(p)(i) = 1 iff ∃j: j includes i and p(j)
b. For any time i, ⟦ PROG Fut$_1$ VP ⟧(i) = 1 iff ∃j: j includes i and
∃k: j is before k and ⟦ VP ⟧(k)

(9) For any time i, ⟦ PROG Fut$_2$ VP ⟧(i) =
1 if ∃k: k includes i and ∀ h, h a history through k: ∃j: k is before j and VP(h)(j);
0 if ∃k: k includes i and ∀ h, h a history through k: ¬∃j: k is before j and VP(h)(j);
and is undefined otherwise

References

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