Will, scope and modality: a response to Broekhuis and Verkuyl*

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Abstract
Kissine (2008) argues that English will cannot be treated as a modal without entailing absurd consequences. Broekhuis and Verkuyl (2014) object that this argument rests on faulty scope relations between negation and will. In this short squib I argue that holding both that will scopes over negation and that will is a modal leads to absurd consequences.

Introduction
It is more than customary to find will enlisted as one of English modals. This is so even in cases where, prima facie, its only function is to displace temporal reference towards the future, as in (1).

(1) Mary will sing.
I say ‘prima facie’ because in languages with a tripartite past-present-future inflectional tense, such as French, the equivalent of (1) belongs to the tense paradigm:

(2) Marie chantera.

Mary sing-IND.FUT.3SG

Of course, intuitions about other languages do not necessarily provide conclusive evidence about English. After all, it is possible that while English marks future reference with the help of a modal, French does so through tense morphology. In Kissine (2008) I argued, however, that future temporal reference in English is not expressed by a modal verb, because English will cannot be analysed as a modal for purely semantic reasons, (the same argument applies to French future tense; see Kissine (2013)). In this short squib, I address a recent objection to this argument by Broekhuis and Verkuyl (2014) who argue that my argument rests on faulty scope relationships between will and

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negation. Broekhuis and Verkuyl’s objection concerns the general structure of my argument, and, for this reason, I will not discuss explicitly the kind of epistemic modality they assign to will.¹

1. The argument against modal analyses of will

Any serious attempt at a modal account needs to posit that will is stronger than a possibility operator. If will were a possibility operator conjunctions like (3) shouldn’t feel like contradictions.

(3) Mary will sing and Mary will not sing.

So, in general, will is said to both shift the evaluation time towards the future and to be a universal quantifier over a certain modal base (e.g. Enç, 1996). Leaving the modal base unspecified, in such theories, then, will appears in LFs as □_{t>n}, where n is utterance time. Let then f be a conversational background that maps w on the set of propositions relevant for determining the modal base of will (cf. Kratzer, 1991). The modal analysis holds that will(φ) is true at the possible world w and at a time n if, and only if, in every possible world w′ of the modal base there is some t which is future relative to n, such that φ is true at t.

(4) [□_{t>n}(φ)]_{w,n} = 1 iff, for ∀w′ ∈ f(w), ∃t>n and [φ]_{w′,t} = 1

In order to understand why this very popular analysis is problematic, it is important to think about the logical properties of the modal base of will. Let us take an ordinary existential modal, which contents itself with quantifying over possible worlds, staying away from tense matters.

(5) [◊(φ)]_{w,n} = 1 iff ∃w′ ∈ f(w) such that [φ]_{w,n} = 1

Let us assume, for the sake of the argument, that the conversational backgrounds in (4) and (5) are identical. The next step then is to negate will(φ). The resulting semantics will be:

(6) [¬□_{t>n}(φ)]_{w,n} = 1 iff ∃w′ ∈ f(w), ∃t>n, such that [φ]_{w′,t} = 0

Now, let us embed not-will(φ) under ◊. What we get now is (7).

(7) [◊¬□_{t>n}(φ)]_{w,n} = 1 iff ∃w′ ∈ f(w), and ∃w′ ∈ f(w′), ∃t>n and [φ]_{w′,t} = 0

Here comes the first problem. As they stand, (4) and (7) predict that will(φ) and it is possible that not-will(φ) are compatible. Imagine that every world w′ in f(w) is a φ-

¹Klecha (2014) presents novel arguments for a modal theory of will and argues that an analysis of will as a historical necessity operator (see Kaufmann, 2005) is immune to my (2008) objections. I reserve the detailed discussion this issue deserves to a future paper.
world (at t). Nothing entails that every \( w'' \) which belongs \( \cap f(w') \) should also be a \( \varphi \)-world (at t). This is a clearly unwelcome consequence, as we want our semantics of will to rule out as contradictory conjunctions such as (8):

(8) Mary will sing, and it is possible that it is not the case that she will sing.

The remedy is simple: the worlds that constitute the modal base of will ought to be linked by transitive accessibility relations:

(9) **Transitivity:** \( \Box \varphi \rightarrow \neg \Diamond \neg \Box \varphi \)

This is all well and good, but consider now what are the truth-conditions for *it is possible that will(\( \varphi \))* under a modal account of will.

(10) \( \Box \varphi \rightarrow \neg \Diamond \neg \Box \varphi \)

The trouble now is that (6) and (10) predict that not-will(\( \varphi \)) and *it is possible that will(\( \varphi \)) are compatible. That there is a possible world \( w' \) in \( \cap f(w) \) where \( \varphi \) is false (at t) does not entail that there are no possible worlds \( w' \) in \( \cap f(w) \), such that every possible world in \( \cap f(w') \) is an \( \varphi \)-world. This, again, is bad, as we want (11) to be a contradiction.

(11) ? It is not the case that Mary will sing, and it is possible that Mary will sing.

The only solution is to argue that, in addition to being transitive, the accessibility relations within the modal base of will are Euclidean:

(12) **Euclideanness:** \( \neg \Box \varphi \rightarrow \neg \Diamond \neg \Box \varphi \)

We now reached the final stage of the argument against the modality of will. It is easy to see that together **Transitivity** (9) and **Euclideanness** (12) entail **Self-Reflexivity**:

(13) **Self-Reflexivity:** \( \Box \varphi \leftrightarrow \Diamond \neg \Box \varphi \)

Anyone who endorses (13) should then treat will(\( \varphi \)) and *it is possible that will(\( \varphi \)) as equivalent. Needless to say, this is a rather unpalatable consequence.

2. **Negation and will**

Broekhuis and Verkuyl (2014) attempt to reject **Self-Reflexivity** (13) by arguing that the truth-functional negation of Mary will sing is not *It is not the case that Mary will sing* but Mary will not sing. They claim that the former version is an instance of metalinguistic negation, and assume that, outside such metalinguistic contexts, will always takes scope over negation. According to them, then, it is (14)c, and not (14)b, that is the correct rendering of (14)a.

(14)

a. ? Mary will sing and it is possible that Mary will not sing.

b. \( \Box \varphi \land \Diamond \neg \Box \varphi \)

c. \( \Box \varphi \land \Diamond \neg \Box \varphi \)

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Since (14)c is a contradiction, there is no need to endorse Transitivity (9) in order to rule (14)a out. Likewise, if will, qua a necessity operator, always takes scope over negation, (15)a should be rendered as (15)c and not as (15)b.

\[ \text{(15)} \]
\[ \begin{align*}
  a. &\quad ? \text{Mary will not sing and it is possible that Mary will sing.} \\
  b. &\quad \neg \Box_{t>n} (\varphi) \land \Diamond_{t>n} (\varphi) \\
  c. &\quad \Box_{t>n} (\neg \varphi) \land \Diamond_{t>n} (\varphi)
\end{align*} \]

Again, because (15)c is a contradiction, one does not need to endorse Euclideanness (12) to rule (15)a out. To sum up, Broekhuis and Verkuyl's (2014) position is that will is a forward-shifting modal which always takes scope over negation. (Their semantics of future is subtler than that, but further details are unessential here.)

Now, to get things straight from the outset, I don’t think that will ought to be located under negation scope in LF. Most probably it should not — on a temporal semantics of will, that is. The issue is rather that anyone who treats will(\varphi) as \Box_{t>n}(\varphi) has to accept that clause-mate negation scopes over \Box_{t>n}.

Take (16)a, which, on the modal conception of will has the logical form in (16)b.²

\[ \text{(16)} \]
\[ \begin{align*}
  a. &\quad \text{It is impossible that Mary will sing.} \\
  b. &\quad \neg \Diamond_{t>n} \text{[Mary sing]}
\end{align*} \]

Now, if will takes semantic scope over negation within its clause, as Broekhuis and Verkuyl have it, (17)a should be interpreted as (17)b.

\[ \text{(17)} \]
\[ \begin{align*}
  a. &\quad \text{It is impossible that Mary will not sing.} \\
  b. &\quad \neg \Diamond_{t>n} \neg \text{[Mary sings]}
\end{align*} \]

The problem is that under this analysis (18)a should not sound as a contradiction, as (18)b is not.

\[ \text{(18)} \]
\[ \begin{align*}
  a. &\quad ? \text{It is impossible that Mary will sing and it is impossible that Mary will not sing.} \\
  b. &\quad \neg \Diamond_{t>n} \text{[Mary sing]} \land \neg \Diamond_{t>n} \neg \text{[Mary sings]}
\end{align*} \]

In fact, the unacceptability of (18)a is a strong indicator that if were a modal will, it shouldn't scope over negation. Compare will to deontic must. Clearly, (19)a can only be interpreted as (19)c; the reading in (19)b is unavailable.

² Needless to say, it would be extremely implausible to argue here that will takes scope over negation. First, this would mean that will moves across clause boundaries, and second, that (16)a means that in all possible worlds \( w \) (of will's modal base) it is the case at \( t>n \) that Mary doesn't sing in all \( w' \) epistemically accessible from \( w \), viz. that (16)a means that it will be impossible that Mary sings at \( t>n \).
For this reason, unlike (18)a, (20)a does not feel like a contradiction: (20)b is the correct logical form.

(20)  

(21)  

(21) a.  

?It is impossible that Mary will sing and it is impossible that Mary will not sing.

b.  

References


