# THE MODAL FUTURE HYPOTHESIS DEBUGGED

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**Abstract**

This note identifies and corrects some problems in developments of the thesis that predictive expressions, such as English *will*, are modals. I contribute a new argument supporting Cariani and Santorio's recent claim that predictive expressions are modals of a non-quantificational kind. At the same time, I improve on their selectional semantics by fixing an important bug. Finally, I show that there are benefits to be reaped by integrating the selection semantics framework with standard ideas about future orientation of modals.

This note identifies and corrects some problems in developments of the "modal future hypothesis" — the thesis that predictive expressions, such as English *will*, are modals.

The modal future hypothesis is assumed here without argument (for arguments, see Klecha, 2014). But it is important to make its content clearer. Start with some rough definitions. The "predictive expressions" of language $\mathcal{L}$ form a subset of the devices of future reference in $\mathcal{L}$, identified by two additional properties. First, predictive expressions refer to the future independently of one's location in time (unlike *in the year 2222*). Second, they do not introduce restriction to a specific interval within the future (unlike frame adverbials like *tomorrow*). Paradigmatic examples of predictive expressions in English are *will* and *gonna*.

The modal future hypothesis is the claim that predictive expressions are modals, in the minimal sense that their lexical entry manipulates a world of evaluation. Although I carry out this investigation with

English as the primary target, there is evidence that the modal future hypothesis holds in a variety of languages besides English (see the cross-linguistic findings discussed in Giannakidou and Mari, 2017; Bochnak, 2019), though there is a substantive question about whether it holds unrestrictedly.

My limited goal is to sharpen our perspective on which semantic implementation of the modal future hypothesis is correct. I do so in three steps: §1 reproduces and extends arguments to the effect that the correct modal semantics uses selection functions. This idea is along the lines of recent proposals by Cariani and Santorio (2018) and, independently, Kratzer (forthcoming). I contribute a new argument in its favor. §2 identifies and corrects a technical bug in Cariani and Santorio's semantics. Their theory projects the wrong modal profile for *will*-sentences. §3 takes up a piece of unfinished business for defenders of selection semantics. In particular, neither Cariani & Santorio nor Kratzer address the future-orientation of sentences involving predictive expressions. I show how to integrate the theory with an off-the-shelf framework for future-orientation (Condoravdi, 2002). This integration is virtuous—leading to benefits that neither selection semantics nor Condoravdi's theory have on their own.

## 1 THE INDISPENSABILITY OF SELECTION

Here is the theory of Cariani and Santorio (2018) in a nutshell. Suppose that context provides a selection function $\sigma : W \times \mathcal{P}(W) \mapsto W$, satisfying these constraints:

> success: if $p \neq \emptyset$, $\sigma(w,p) \in p$
>
> centering: if $w \in p$, $\sigma(w,p) = w$

Letting $D$ be a variable provided as argument to *will* and ranging over modal domains (sets of worlds). Say that two worlds are historical alternatives to each other relative to a time $t$ if they agree about all matters of particular fact up the to $t$; the "historical possibilities" in context $c$ are those worlds that agree with the settled facts up to the time of $c$. If contexts determine possible worlds (which some in this literature dispute), the historical possibilities in $c$ are exactly the historical alternatives to the world of $c$ up to the time of $c$.[1]

[1] For more on the foundational interpretation of this notion of historical possibility, see Cariani and Santorio (2018), as well as *author, redacted*.

Cariani and Santorio propose the semantic entry in (1) together with the metasemantic thesis in (2):

(1) $[\![will_D]\!] = \lambda p.\lambda w.p(\sigma(w, D))$

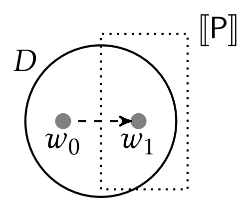
(2) in context $c$, $D$ is initially assigned to the historical possibilities in $c$.

The domain variable $D$ might be intervened on by conditional antecedents as well as by discourse-level operations such as modal subordination.

Register five critical features of the theory in (1)-(2).

(i) Say that a "bare forecast" is an unembedded *will* sentence with no adjuncts, like *it will rain*. Suppose the world of utterance is $w_0$. Then $will_D$(*it rains*) is true at $w_0$ if and only if *it rains* is true at $w_0$.[2] In this sense, *will* makes a trivial contribution to the truth-conditions of bare forecasts.

(ii) The semantics invites the additional assumption that conditional antecedents restrict $D$. If so, the use of selection functions is not trivial in conditionals of the form *if* P, *will* Q. Restricting $D$ with the antecedent proposition $[\![\mathsf{P}]\!]$ might slice off the actual world, leaving the selection function to do non-trivial work. Diagrammatically:




(iii) The modal domain $D$ may also be intervened on by means of modal subordination (Roberts, 1989; Klecha, 2014; Cariani and Santorio, 2018). As with conditional restriction, restriction-by-subordination can leave the selection function with non-trivial work to do.

(iv) The theory does not even attempt to account for the future orientation of sentences like *It will rain*. All temporal structure is idealized away.

[2]Explanation: if $w_0$ is the actual world of $c$, then $w_0 \in D$ because $w_0$ must be a duplicate of itself up to the time of $c$. By centering, $w_0$ must be selected.

(v) Though the theory evaluates *will*-sentences relative to a single world, it is available to defenders of branching metaphysics *via* the supervaluation techniques of Thomason (1970).[3]

Cariani and Santorio (2018) give two kinds of arguments for the selectional account over its quantificational competitors. As a foil, consider a baseline quantificational account. Let $f$ be a historical modal base, returning for each world $w$ and context $c$ the set of worlds that are exactly like $w$ up to the time of $c$.

(3) $[\![will_f]\!] = \lambda p.\lambda w.\forall v \in f(w), p(v)$

This is, in essence, the "Peircean future tense" of Prior (1967, ch. VII). According to (3), bare forecasts express necessity restricted to the historical possibilities. Contemporary defenders of quantificational theories typically endorse modified versions of (3),[4] typically by adding an ordering source.[5] I will not consider these modifications here, as (3) suffices to highlight the shortcomings of all quantificational accounts.

The first argument against (3) is that it incorrectly predicts that *will* enters in non-trivial scope relations with negation.[6] If it did, we should be able to detect truth-conditional differences between *will*>*not* scope configurations and *not*>*will*. But we do not. It is tempting to file this under the more general category of idiosyncratic interaction between English modals and negation. But there is more to the case of *will*. We can sidestep the peculiar scope demands of English modals by using quantificational determiners that bundle in negation. Note that (4a) and (4b) are equivalent, while (4c) and (4d) are not (Higginbotham 1986, 2003).

(4) a. Everyone will fail, if they goof off

b. No one will pass, if they goof off

[3]Thomason's thesis is sometimes confused with a quantificational theory of *will* in the linguistics literature—e.g. in Copley (2009, p.12), and Bochnak (2019). This is a misinterpretation of Thomason's formalism. The universal quantification introduced by the supervaluationist technique is not attached to any lexical item. Instead, it is a device to resolve indeterminacies (such as for example the indeterminacy concerning which world is actual in a branching setting).

[4]I ignore existential accounts, which are convincingly refuted in Kissine (2008).

[5]The ordering source is normality-based in Copley (2009), probabilistic in Kaufmann (2005); and knowledge-based in Giannakidou and Mari (2017).

[6]MacFarlane (2014); Schoubye and Rabern (2017); Cariani and Santorio (2018).

c. Everyone has to fail, if they goof off

d. No one has to pass, if they goof off

Any satisfactory account of predictive expressions must explain why they appear to be "semantically scopeless" in such occurrences.[7]

These arguments strike against most, but not all, quantificational theories. In particular, they are effectively defused by analyses of *will* that appeal to the phenomenon of homogeneity. This appeal is a core tenet of Copley's (2009; 2014) account (see also Kaufmann, 2002). While Copley's theory is more complicated, amending (3) to (5) illustrates the essential idea.

(5) $[\![will_D]\!] = \lambda p.\lambda w : D \text{ is homogeneous w.r.t } p. \forall v \in D, p(v)$

where $D$ is homogeneous w.r.t $p$ iff either $D \subseteq p$ or $D \subseteq \overline{p}$

With some work (which I won't repeat here), this approach can capture the apparent equivalence of (4a) and (4b), and the validity of disjunctions of the form: *will* P *or will not* P.

Against this, Cariani and Santorio advance a second argument— one that involves judgments about credence.[8] Suppose that a genuinely indeterministic coin is tossed in a fair setup. Suppose also that you know all this. The key observation is that it is permissible — maybe even required — to have an intermediate credence, plausibly .5, in the proposition expressed by *the coin will land heads*. That is not predicted by the quantificational semantics in (3) nor by its homogeneity-enriched sibling (5). According to the semantics in (3), the information in the scenario guarantees that $will_D$*(heads)* is false. After all, one can conclude only by reasoning with the given information that $will_D$*(heads)* expresses the empty proposition, in which one ought to have credence zero. The homogeneity semantics in (5) is minimally, but not substantially different: one's credence in $will_D$*(heads)* should be whatever is appropriate when one knows that a presupposition fails. Such a credence should arguably

[7]For some authors (Giannakidou and Mari, 2017; Todd, forthcoming) the behavior of *will* with respect to negation is well explained by positing that it always takes wide scope over negation. Unfortunately, these authors do not engage with data like the ones in (4) nor with the credence arguments to follow.

[8]For ancestors of this argument, see Prior (1976) and Belnap *et al.* (2001). For analogues involving conditionals, see Edgington (2008), Santorio (2017, ms.), Mandelkern (forthcoming).

be zero (one knows something incompatible with the sentence's truth-condition) or undefined.

I find this argument convincing, but some might worry that it relies on judgments about rational credence that are not canonized in semantics, or that it involves unspoken assumptions that demand caution. So, let me emphasize some related, but more conventional, problems. Probability operators, (e.g. *it is likely*) can turn judgments about credence into more standard judgments about acceptability. Suppose that the coin is 80% biased towards heads, while still keeping the setup indeterministic. In such a case, quantificational theories fail to predict the acceptability of,

(6) It is likely that the coin will land heads

Retrospective evaluations dramatize this remark (Prior, 1976). Imagine that you have organized a parade for Tuesday. On Monday, your friend Nara says *it will rain tomorrow*. Tuesday arrives and it rains. You are then in a position (on Tuesday) to recognize the truth of what Nara asserted on Monday. No quantificational view predicts this, however. The conclusive evidence you obtained on Tuesday only settles how things went in *one* of Monday's historical possibilities. By contrast, if on Tuesday it didn't rain, you would be in a position to evaluate Nara's assertion as false. The upshot is that the truth-value of *it will rain* is entirely settled by the actual profile of its prejacent. Instead, quantificational theories must demand that other elements of the modal profile of the prejacent of *it will rain* matter to its evaluation.

## 2 MODAL BASES IN SELECTION SEMANTICS

I take it that these considerations establish selection semantics as the correct framework for a modal analysis of *will*. But which selection-based theory is best?

Not the one in Cariani and Santorio (2018). That theory turns out to have a bug in a big place. It assigns the wrong modal profile to *will* sentences. I illustrate the problem by considering the interaction between *will* and *believe*: if we give belief reports a standard quantificational semantics, then if it rains at all the historical possibilities, it must follow, implausibly, that I believe it will rain. Although I illustrate the problem with attitude reports, the issue that causes it is rather general: the same bug shows up in interactions between predictive expressions and epistemic modals and probability operators.

Let $\mathbf{bel}_\alpha$ be a belief operator, endowed with a quantificational semantics.[9] Letting $d(\cdot)$ be a function that outputs $\alpha$'s doxastic state in $w$, define:

(7) $[\![\mathbf{bel}_\alpha]\!] = \lambda p.\lambda w.\forall v \in d(w), p(v)$

Consider a context whose historical possibilities $D$ all agree that it will rain tomorrow. However, $\alpha$'s state lets in some merely doxastic possibilities in which it does not rain. Because of these doxastic possibilities, it should then be false that $\alpha$ believes that it will rain. To make this more precise, let $w$ be one of the historically possible worlds. We want the semantics to predict that $\alpha$ does not believe that it will rain::

(8) $[\![\mathbf{bel}_\alpha(will_D(\text{it rains}))]\!](w) = 0$

This should be false because there $\alpha$'s doxastic possibilities include a world, call it $v$, in which it does not rain—that is, because:

(9) $[\![will_D(\text{it does not rain})]\!](v) = 1$

However, this expectation is frustrated. The selected world at $v$ must come from $D$ and $D$ is the set of historical possibilities *in the utterance context*. This requires $\sigma(v, D)$ to be a rain-world, since the historical possibilities in the utterance context were stipulated to all be rain worlds.

The bug is easy enough to fix. Instead of requiring $D$ to be a domain, let it be a modal base — a function $f$ that maps worlds to modal domains. The revised analysis is in (10), with its associated metasemantics in (11).

(10) $[\![will_f]\!] = \lambda p \lambda w.p(\sigma(w, f(w)))$

(11) in context $c$, $f(w)$ is initially assigned to the function that maps each world $w$ to the historical possibilities in $w$ relative to context $c$.

If we assume, as seems plausible, that the relation $\lambda w \lambda v.v \in f(w)$ is an equivalence relation, then $f$ partitions any set of possibilities into cells

[9]The choice of a quantificational semantics is purely for illustration purposes. Another analysis or another epistemic operator would illustrate the issue just as well.

whose members are historical alternatives to each other at the time of the context.

This revised analysis delivers the prediction in (8). To see why, reconsider (9). When evaluating from $v$'s perspective, our selection term is not $\sigma(v, D)$ but $\sigma(v, f(v))$, which by centering is $v$ itself. This is fortunate since $v$ is the epistemically but not historically possible sunny world: (9) holds and so does (8).

## 3 SELECTION SEMANTICS AND FUTURE ORIENTATION

None of this speaks to the future orientation of typical *will* sentences. Obviously, the eventuality that is described in a bare forecast must be located in the future for the sentence to be true.

(12) a. # I eat tomorrow

b. I will eat tomorrow

In English, bare present tense sentences like *I eat* cannot have future reference times. Hence, (12a) is only acceptable on a "scheduled" reading, unlike its bare forecast counterpart in (12b). An adequate account of the semantic contribution of predictive expressions must capture their ability to shift the evaluation of a sentence towards the future.

The selectionist theories I have considered punt on this task by declining to supply worlds with temporal structure. To tackle this unfinished bit of the agenda, start by enriching worlds with a series of times ordered by a temporal precedence relation $<$. Cariani and Santorio (2018) float an analysis of *will* that makes it *both* a selectional modal and a quantifier over times. To develop this idea, assume that sentences denote functions from world/time pairs to truth-value. Let **p** range over such functions. Next, extend the selection semantics insight so as to predict the (typical but not universal) future-orientation of *will*-sentences.

(13) $[\![will_f]\!] = \lambda \mathbf{p}.\lambda w.\lambda t.\exists t' > t, \mathbf{p}(\sigma(w, f(w)), t')$

The problem is that (13) undermines a key element of the motivation for selection semantics. It predicts non-trivial scope interactions between *will* and negation, because the existential quantifier in the denotation of *will* combines differently with negations scoping over or under it.

My technical task here is to integrate this standard idea with the selectionist approach so as to predict the future orientation of *will* sentences. That integration is facilitated by the fact that there already are several unified frameworks involving events, worlds and times, such as Condoravdi (2002); Hacquard (2006); von Stechow and Beck (2015). Here, I integrate selection semantics with a modified version of Condoravdi's system, because it is the minimal basis on which to satisfy the design principles outlined above.

For Condoravdi, *will* is future-oriented partly because it is a core lexical feature of modals that they can extend intervals of evaluation into the future.[10] Condoravdi appeals to the quantificational analysis of *will* I rejected above (Condoravdi, 2002, p.13): according to her, *will* quantifies over historical possibilities and extends an interval of evaluation. Instead, I propose that *will* performs world selection and interval extension. I hope to show that this integration is fruitful both from the point of view of selection semantics and from the point of view of Condoravdi's system.

Moving on to the formalism, consider a toy language built out of "sentence radicals". These are tenseless descriptions of events or states (and accordingly further classified as *eventive* or *stative*). In a fuller theory, these classification would emerge from the semantics of the verb together with an analysis of aspect. Like Condoravdi, we take a modular perspective and assume that the classification of radicals as eventive and stative is given. Following consensus among defenders of the modal future hypothesis, and in particular Abusch (1997), we decompose *will* in terms of present tense plus the modal morpheme WOLL. Both PRES and WOLL belong to the primitive stock of symbols of the language. We won't have much of a reason to investigate past tense, but it is also important to the semantic picture that we decompose *would* as PAST+WOLL.x The system allows composite tenses *via* a perfect operator PERF.

### 3.1 Models

I interpret this language against $W \times T$ structures (Thomason, 1984), extended so as to include events and states. Specifically, define a model $\mathcal{M}$ as a 7-tuple $\langle \mathcal{W}, \mathcal{T}, \mathcal{E}, \approx_t, <, \tau, v \rangle$ where:

[10]This is not to say that all modal sentences end up being future oriented. In Condoravdi's system, modals scoping under perfect can get non-future oriented interpretations.

- $\mathcal{W}$, $\mathcal{T}$, and $\mathcal{E}$ are respectively non-empty sets of worlds, times and eventualities (events or states).

- $\approx_t$ is a relation between worlds indexed to a time. ($\mathcal{T} \mapsto \mathcal{W} \times \mathcal{W}$). Intuitively $w \approx_t v$ iff $w$ and $v$ are duplicates up to time $t$.

- $<$ is a irreflexive, transitive and linear relation on times ($\mathcal{T} \times \mathcal{T}$). Interpret this as the temporal precedence relation. I occasionally abuse notation and use $<$ to relate *intervals* i.e. convex sets of times, so that $\mathcal{I}_1 < \mathcal{I}_2$ iff every point in $\mathcal{I}_1$ precedes every point in $\mathcal{I}_2$.

- $\tau$ is a function from event/world pairs to intervals ($\mathcal{E} \times \mathcal{W} \mapsto \mathcal{P}(\mathcal{T})$). Intuitively, $\tau(e, w)$ is the temporal trace of $e$ in $w$.

- $v$ is a valuation function that inputs a sentence radical P, an event $e$ and a world $w$. It outputs 1 if $e$ is an eventuality in $w$ and P is a type of event that describes $e$; 0 otherwise.

For a guiding example of what it is for a radical to describe a type of event, think about the relationship between *they win* and events of winning by the referenced group.[11]

It is convenient to state the semantics with the help of the following abbreviations.

- if $\mathcal{I}$ is any interval, EXT($\mathcal{I}$) is the extension of $\mathcal{I}$ towards the future.

$$\text{EXT}(\mathcal{I}) = \mathcal{I} \cup \{x \in \mathcal{T} \mid \text{ for all } t \in \mathcal{I}, x > t\}$$

- *now*: the present moment, given a context. (not an interval)

- $\sigma$: a selection function (provided by context), satisfying:

  success: for $w \in \mathcal{W}$, $p \subseteq \mathcal{W}$ with $p \neq \emptyset$, $\sigma(w, p) \in p$

  centering: for $w \in \mathcal{W}$, $p \subseteq \mathcal{W}$ with $w \in p$, $\sigma(w, p) = w$

- $f$: a modal base (provided as an argument to WOLL)

- $\circ$: the overlap relation between intervals

[11] Condoravdi does not use valuation functions in her semantics. However, my use of them doesn't reflect any commitments that are not already commitments of Condoravdi's system. When $P$ is eventive or stative, she writes $\mathsf{P}(e)(w)$ to mean that $e$ is an event of the type described by $P$ and occurs in world $w$. This is obviously equivalent to writing $v(\mathsf{P}, e, w) = 1$.

## 3.2 Semantics

Onto the semantic theory. Start with the evaluation of radicals. Reserve Q for eventive sentence radicals and R for stative sentence radicals. Here we simply replicate Condoravdi's (2002) clauses in our framework:

$$[\![\mathsf{Q}]\!] = \lambda w.\lambda \mathcal{I}.\exists e(v(\mathsf{Q}, e, w) = 1 \;\; \& \;\; \tau(e, w) \subseteq \mathcal{I})$$

$$[\![\mathsf{R}]\!] = \lambda w.\lambda \mathcal{I}.\exists e(v(\mathsf{R}, e, w) = 1 \;\; \& \;\; \tau(e, w) \circ \mathcal{I})$$

An eventive radical, such as *I go home* is true at $w$ and $\mathcal{I}$ iff the temporal trace of my going home in $w$ is wholly included in $\mathcal{I}$. A stative radical, such as *I be home* is true at $w$ and $\mathcal{I}$ iff the temporal trace of my staying home overlaps $\mathcal{I}$.[12]

In Condoravdi's system, sentences denote functions from worlds to truth values. However, much of the semantic computation manipulates functions from world-interval pairs to truth values. Call such functions *interval intensions* and reserve upper-case bold variables like **P** to range over them. In this system, an important job of tense is to input interval intensions and output propositions (i.e. sets of worlds). Indeed, tenses head clauses and part of their semantic role is to saturate temporal interval arguments. In particular, the semantic entry for PRES is:

$$[\![\textsc{pres}]\!] = \lambda \mathbf{P}.\lambda w.\mathbf{P}(w, \{now\})$$

This analysis makes PRES an indexical: PRES(I be home) is true at a world $w$ just in case there is a state corresponding to me being home that occurs in $w$ and overlaps the time of context of utterance. Several well-known anaphoric effects involving tense cannot be captured under this indexical analysis (see Partee 1973 for classic arguments and Grönn and von Stechow 2016 for a recent overview). Such effects may be captured by an alternative analysis—for instance by letting the interval of evaluation for PRES be the reference of a covert variable. While it seems plausible that tenses might be ambiguous between an anaphoric and an indexical meaning, I won't develop this thought here.

Condoravdi provides an analysis for perfect that is critical to her account of the tense-modal interaction (though not especially important to the present dialectic).

[12] Condoravdi also considers "temporal properties", but have slightly modified her setup to make them unnecessary while still retrieving the same truth-conditions for clauses.

$$[\![\textsc{perf}]\!] = \lambda \mathbf{P}.\lambda w.\lambda \mathcal{I}.\exists \mathcal{I}^* < \mathcal{I}, \mathbf{P}(w, \mathcal{I}^*)$$

Note that unlike tenses, PERF outputs an interval intension. Only simple tenses saturate the interval argument in the system and the perfect is not a simple tense, but a device to create composite tenses. Though Condoravdi does not discuss past tense operators, the natural entry within her framework would make PAST(·) equivalent to PRES(PERF(·)).

We can now implement the selection semantics for WOLL. In accordance with our design specifications, WOLL makes two contributions. It selects a world out of the historical modal base and it extends the interval of evaluation into the future.

$$[\![\textsc{woll}]\!] = \lambda f.\lambda \mathbf{P}.\lambda w.\lambda \mathcal{I}.\mathbf{P}(\sigma(w, f(w)), \textsc{ext}(\mathcal{I}))$$

Neither effect involves quantification and the resulting theory happily predicts that *will* and *not* commute.

### 3.3 Illustrations

Here is an illustration of the truth-conditions that this system projects on bare forecasts with eventive prejacents, like *I will eat*:

**Truth conditions for *will* P (for P eventive)**

i. $[\![will_f(\mathsf{P})]\!] = [\![\textsc{pres}(\textsc{woll}(f, \mathsf{P}))]\!] = [\![\textsc{pres}]\!][\![(\textsc{woll}(f, \mathsf{P}))]\!]$

ii. $[\![\textsc{woll}(f, \mathsf{P})]\!] =$

$$= \lambda w.\lambda \mathcal{I}.\exists e(v(\mathsf{P}, e, \sigma(w, f(w))) = 1 \;\; \& \;\; \tau(e, \sigma(w, f(w))) \subseteq \textsc{ext}(\mathcal{I}))$$

Putting i. and ii. together and thus saturating the interval argument with PRES:

iii $[\![will_f(\mathsf{P})]\!] =$

$$= \lambda w.\exists e(v(\mathsf{P}, e, \sigma(w, f(w))) = 1 \;\; \& \;\; \tau(e, \sigma(w, f(w))) \subseteq \textsc{ext}(\{now\}))$$

As these truth-conditions show, bare forecasts shift the evaluation of their prejacents towards the future: *it will rain* is true if there is a raining event in the selected world whose temporal trace is included in the non-past interval.

The remaining question is whether we have accomplished this result in a way that is consistent with the remainder of our motivation. The basic desideratum, inherited from Cariani and Santorio (2018), was to have a modal analysis according to which *not* and *will* commute. This is where (13) failed.

**Fact 1** *will* P *and* will not *P have complementary truth conditions*

Consider the case of eventive prejacents and recall the truth conditions for *will* P we just derived, namely:

$$\lambda w.\exists e(v(\mathsf{P}, e, \sigma(w, f(w))) = 1 \ \ \& \ \ \tau(e, \sigma(w, f(w))) \subseteq \textsc{ext}(\{now\}))$$

**Truth-conditions for *will*(*not* P) (for P eventive)**

$$[\![will_f(\text{not P})]\!] =$$

$$= \lambda w.\neg\exists e(v(\mathsf{P}, e, \sigma(w, f(w))) = 1 \ \ \& \ \ \tau(e, \sigma(w, f(w))) \subseteq \textsc{ext}(\{now\}))$$

It is easy to see that these truth-conditions are precisely complementary to those of the bare (non-negated) form.

A simple fusion with Condoravdi's framework for future orientation provides a simple and elegant account of future orientation within the framework of selection semantics that is actually compatible with the data that motivate selection semantics in the first place. The choice of Condoravdi's framework is not mandated. It is a simple homework to extend the present account to the more elaborate system for the integration of events, times and worlds in von Stechow and Beck (2015). The present development stands as a proof of concept, and blueprint for such extensions.

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