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ORIGINAL RESEARCH

Future and Negation

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Abstract
In this article, we take into consideration two semantics of the future tense: linearism, according to which future-tense sentences are interpreted on a single history, and universalism, according to which they are evaluated by universally quantifying on the plurality of future histories that radiate from the present instant. Specifically, we focus on a objection advanced against universalism: if universalism were correct semantics of *will*, negated future-tense sentences of natural language should have two readings, depending on the scope of negation with respect to the universal quantifier on histories. However, since natural language does not show this difference, one may conclude that there is no universal quantifier in the interpretation of these sentences. We show that this conclusion is premature. First, *will* has clear scope interactions with indefinite nouns phrases, contrary to what linearism predicts. Second, it is possible to extend the treatment of vague predicates as partial predicates to *will*: Since partial predicates have no scope interactions with negation, this can account for the scopelessness of *will*. The partiality of truth conditions is not restricted to *will* but also pertains to counterfactuals and generics and probably is part of a general tendency to maximize contraries.

1 Introduction

The semantics and the metaphysics of the future are, since Aristotle's *De Interpretatione*, a highly debated issue. There are many options and there are many reasons to adopt one or other view about the future; for instance, *logical*, *semantical*, *epistemic*, *metaphysics* reasons. In the following, we focus on two alternative stances about the nature of the future. We call them *linearist* and *universalist* views (see for instance (Cariani & Santorio, 2018), (Todd, 2020)).

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In a nutshell, according to linearists, future-tense sentences are interpreted based on a single history and, therefore, refer to something that happens in that history at some instant after the evaluation instant. Universalists, on the contrary, think that future-tense sentences should be evaluated by quantifying on the plurality of future histories that radiate from the present instant. In this case, the set of future instants is constituted by all instants belonging to all histories branching from the present. It is worth noting that the distinction between linearists and universalists is semantical and not metaphysical. That is, it does not concern the topological structure of time – i.e., if the future is actually branching – but how we *evaluate* future-tense sentences. These questions are obviously connected but, as we will see, it is possible to consider the future as metaphysically open despite endorsing linearist semantics.

In this paper, we take into account the following classical semantic argument for linearism. Let us consider negative future-tense sentences:

(1) It will not rain tomorrow.
(2) It is not the case that it will rain tomorrow.

If the interpretation of the future operator were a universal quantification on histories, then (1), (2) should have different meanings. Supposing that these two sentences are to be regimented as $\mathbf{F}\neg\varphi$ and $\neg\mathbf{F}\varphi$, (1) is true only if in all histories it will not rain tomorrow, while it is sufficient that there exists one history in which it will not rain tomorrow to make (2) true. However, as it has been remarked in the literature, natural language sentences do not show this difference: (1) and (2) seems to have the same meaning.

This fact is even more remarkable if we compare the future with other modals that universally quantify on a domain of possible worlds:

(3) It is necessary that you do not come.
(4) It is not necessary that you come.
(5) I am sure that Paul will not come.
(6) I am not sure that Paul will come.

(3), (4) and (5), (6) have clearly different meanings arising from the different scope of negation with respect to the universal quantifier on possible worlds. (3), for instance, is true if in all worlds the addressee does not come while (4) is true if there exists at least one world in which the addressee does not come. Why doesn't the future show the same difference? The linearist can, at this point, argue that (1) and (2) do not have different meanings precisely because they do not universally quantify on histories: the right interpretation of future-tense sentences is based on just one history. Therefore, (1) and (2) have the same meaning precisely because they are true if and only if, within the only future history on which we evaluate, it will not rain tomorrow. As a consequence, the behavior of *will* towards negation seems to be a point in favor of linearism.

In this paper, we want to show that universalism (or, at least, one version of it) can be defended against this charge and, moreover, compared to linearism, it is in a

better position regarding the interpretation of some other linguistic data. The structure of this paper is as follow: in the next section, we examine different forms of linearism and universalism. In Sect. 3, we discuss the scopelessness of *will*; in Sect. 4, we show that there are contexts in which *will* does not seem to be scopeless with respect to other logical operators, as quantifiers, leading to a stalemate between universalists and linearists. Section 5 offers a way out of this stalemate by providing a construal of *will* akin to the interpretation of partial predicates. In Sect. 6, we show how the obtained results are in line with some other typical natural language phenomena in which a tendency from contradictory to contrary manifests itself. Section 7 provides the conclusion.

2 Different forms of linearism and universalism

In the previous section, we made a distinction between the linearist and universalist semantics of the future. But there are many kinds of linearism and universalism. A first choice for linearists is *determinism*. According to determinism, the future is not open since the actual conditions of the world and its laws univocally determine the future. Therefore, there is just one metaphysically possible future history and, accordingly, the interpretation of future-tense sentences refers to that history.

There are other forms of linearism that do not entail a deterministic conception of reality: In other terms, it is possible to combine an open metaphysical view of the future with linearist semantics. The Thin Red Line (TRL) semantics adopts this train of thought (see for instance, (Øhrstrøm, 1981, 2009; Malpass & Wawer, 2012; Wawer, 2014; Wawer & Malpass, 2020)); according to TRL-theorists, future-tense sentences are interpreted with respect to the future history that will actually happen. Given an instant t, we thus have many histories radiating from t but one is privileged since it is the history that will become true. TRL-theorists claim that, in this way, it is possible to distinguish between a true future and a necessary future: Even if it is true that a certain fact will happen tomorrow, it is not necessary that that fact will happen.

According to a third form of linearism, there exists an actual future history, but it is indeterminate which one it is. As in the TRL scenario, there are many future histories and only one will become real. However, unlike in the TRL view, it is not determinate which this history is – it could be any of the open histories at the present instant. It should be noted that this indetermination is not only epistemic, but also ontological. Cariani and Santorio (2018) claim that, even adopting this view, it is possible to account for the fact that *will* is scopeless with respect to negation. According to them, the semantics of *will* is characterized by an operator s that selects a unique history among the various open histories: it is the actual history of the world. Consequently, the evaluation of the sentence refers to this history, and this explains the scopelessness of *will* with respect to negation.

Cariani and Santorio, on the basis of Barnes and Cameron (2009), argue that selection function s is determined by the context in which a sentence is uttered. However, according to them, it is indeterminate which context we actually are in when we utter a sentence expressing a future-tense proposition. This means that it

is indeterminate which the selection function is and, consequently, which the actual future history of the world will be.

Therefore, even though future-tense propositions are evaluated with respect to a single history, it is indeterminate which this history is. This does not, however, affect the relationships between negation and *will*: Even if it is indeterminate which the actual world is, *will* is, nonetheless, evaluated with respect to one history. There is no difference between the truth conditions of $\neg\mathbf{will}\varphi$ and $\mathbf{will}\neg\varphi$.

Finally, Patrick Todd (cf. Todd (2020; 2021)) is a universalist and believes that future-tense sentences should be interpreted by quantifying on all histories open at the moment of evaluation. However, to explain the behavior of *will* with respect to negation – as well as other facts regarding future-tense sentences that do not concern us here – he tells an *error theory linearist story*. Although there is no privileged future history, commonly but erroneously, people presuppose that there is one. This explains why sentences such as (1), (2) seem to have the same meaning. However, this is just appearance: if we remove the unique-history assumption, (1) and (2) have different meanings as universalists claim:

> [I]n ordinary contexts, it is presupposed that there exists what we might call "the future" - and so, if it doesn't feature p in n units time, it instead features $\neg p$ in n units time. However, my contention is this. Once we move to (admittedly) non-ordinary, metaphysically-loaded contexts, in which we are explicitly considering the metaphysical model of the "open future", we can see that scopelessness breaks down. In such a context, there is, I argue, no reason to maintain that if it is not the case that the future features p in n units time, it therefore follows that it instead features $\neg p$ in n units time (Todd (2020), p. 5055).

By "open future", Todd is referring to a theory in which there are many future possibilities departing from the actual instant, without any history being privileged. Todd argues that the metaphysical model according to which there is a privileged history is the picture implicitly assumed by people in daily speech. This is the reason why it is so hard to appreciate the scope differences of *will* with respect to negation.

According to Todd, *will* is not the only operator that has these features. Referring to Laurence Horn's works (Horn (1975, 1989, 2015)), Todd notices that other modal operators as *know*, *suppose*, *believe*, *want*, and so on, also seem to be scopeless with respect to negation:

(7) John doesn't think that Ann is going home.
(8) John thinks that Ann isn't going home.
(9) John doesn't want that Ann goes home.
(10) John wants that Ann does not go home.

The pairs (7), (8) and (9), (10) seem to have identical meanings. In literature, this phenomenon is called *neg-raising*. It is the tendency to consider contradictory two sentences that are, actually, just contrary: "a believes that p" and "a believes that $\neg p$" are, strictly speaking, contrary because both can be false, if a is agnostic regarding p. However, in many cases, the agnosticism is not considered and it is assumed that subjects have clear cut opinions. If the disjunction "either a believes that p or

a believes that ¬*p*" is pragmatically presupposed, any scope difference disappears and (7) is considered equivalent to (8). The same holds for (9) and (10): usually, the absence of desires is not considered and that makes the two sentences equivalent.

Something similar, according to Todd, holds for the future. Normally, it is presupposed that there is just one actual history of the world. In this history, within *n* units of time from now, either *p* will occur or *p* will not occur.[1] Consequently, the following disjunction is presupposed: **Fn***p* ∨ **Fn**¬*p*. In the unique true history of the world, within *n* units of time either *p* or ¬*p* will be true. This eliminates any scope difference between **Fn**¬*p* and ¬**Fn***p*. But if the presupposition that there is just one true history of the world disappears, then the disjunction cannot be presupposed any more and the scope difference emerges again.

So far we distinguished some linearist stances. Within the universalist camp, we can individuate two general strategies. One can maintain classic semantics and, then, claims that a future-tense sentence **F***p* is true if and only if, in all future histories that stem from the present, there is an instant in which it is true that *p* and false otherwise. This is the standpoint of Peircean semantics (for instance, (Todd, 2016, 2021)). It is easy to realize that, according to Peirceanism, all future contingents are false, since, by definition, a future contingent is neither necessary nor impossible. There is at least one history in which a future contingent is true and at least another history in which it is false. In this case, thus, both **F***p* and **F**¬*p* are false.

Alternatively, one can claim that a future-tense sentence **F***p* is true if in all future histories there is an instant at which *p* is true, false if in all future histories there is an instant at which *p* is false, and indeterminate otherwise. According to this view, future contingents are indeterminate precisely because, by definition, they are neither necessary nor impossible. Thus, both **F***p* and **F**¬*p* are indeterminate in this case (for a semantics of the future along this line, cf. (Copley, 2009)).

Nevertheless, both universalist theories, at least *prima facie*, are at odds with the fact that (1)-(2) seem to have the same meaning. Both theories suppose that there is a difference in the truth conditions of ¬**F***p* and **F**¬*p*. However, within daily linguistic practices, this difference does not appear. This leads one to think that the right semantics of *will* is linearist. We believe that this conclusion is premature. But, before laying out the argument of this thesis, we wish to explore the relationships between negation and future operators and how to intend the claim that *will* is scopeless with respect to negation.

3 The scopelessness of *will*

In articulating their criticism against universalist views, Cariani and Santorio claim that *will* is scopeless with respect to negation (Cariani and Santorio (2018), pp. 134–5). This needs to be clarified. In fact, linearist theories require the presence of an existential quantifier over times in order to provide the truth-conditions of *will*; negation can have either narrow or wide scope with respect to this

[1] In the next section, we will clarify why Todd uses the operator **Fn** instead of the operator **F**.

quantifier. In other terms, we can have the following two construals of a sentence such as "It will not rain":

- $\mathcal{M}, t \vDash \mathbf{F}\neg p$ if and only if $\exists t' > t, \mathcal{M}, t' \vDash \neg p$
- $\mathcal{M}, t \vDash \neg\mathbf{F}p$ if and only if $\neg\exists t' > t, \mathcal{M}, t' \vDash p$

According to the first interpretation, there exists at least one future instant at which p is false (this interpretation is, then, equivalent to $\neg\mathbf{G}p$). According to the second interpretation, there is no future instant at which p is true: that is, p is false at all future instants (and this construal is equivalent to $\mathbf{G}\neg p$). These two readings seem to occur in natural language; negative future-tense sentences can be intended sometimes according to one construal and sometimes according to the other. For instance:

(11) I will not have my breakfast.
(12) There will not (ever) be a fourth war world.

The most natural reading of (11) is not that the speaker will never have her breakfast in the future but that, at the time at which she should have her breakfast, she will not have it. Therefore, the sentence is true if there exists an instant, subsequent to the present, at which the speaker does not have her breakfast. On the contrary, it seems that (12) means that there is no future instant at which there is a fourth war world.

It should be noted that this scope difference is independent from the fact that the future is conceived as linear or branching; in most semantical account of the future, an existential quantifier is present in the interpretation of *will*. Let $\mathcal{H}_t$ be the bundle of histories that pass through t; then we can distinguish between:

- $\forall h \in H_t, \exists t' > t, \mathcal{M}, t'/h \vDash \neg p$
- $\forall h \in H_t, \neg\exists t' > t, \mathcal{M}, t'/h \vDash p$

The difference between (11) and (12) can also be understood in a universalist context since, as we have seen, it *does not* depend on the quantifier on histories but it *does* depend on the quantifier on times.

It seems that (11) and (12) express two different meanings of future; in the first case, it is implicit that there is a specific temporal reference, that is, an instant which the future operator points at. In (11), the idea is that the speaker will not have her breakfast tomorrow or on another contextually relevant day ("The day of my trip, I will not have my breakfast since I have to go to the airport very early"). On the contrary, in (12), there is no privileged instant of reference.

One can maintain that the difference between (11) and (12) must be captured by a suitable restriction of the quantification domain of instants; for instance, (11) should be evaluated with respect to a *class* of coincident instants (which correspond to the moment or the interval at which the speaker usually have her breakfast). In the linearist case, this class has just one element, since the evaluation refers to a single history. In the universalist case, on the other hand, the class is constituted by all instants, belonging to the various histories, that intuitively refer to the instant or the interval at which the speaker usually have her breakfast. Cariani (2021) has recently

proposed a semantics that dispenses with the existential quantifier altogether. In this semantics, future-tense sentences are evaluated with respect to intervals of time and their extension towards the future. An existential quantifier is present but it quantifies over events or states and not over times. A future-tense sentence is true with respect to an interval $\mathcal{I}$ if there is an event or state whose temporal trace overlaps (for states) or is contained (for events) in the union between $\mathcal{I}$ and its extension towards the future. Therefore, according to Cariani, the difference between (11) and (12) is not semantics but it is presumably due to pragmatic factors.

Since the question of the scope of negation with respect to the existential quantifier is largely orthogonal to the debate between linearists and universalists and since it is likely to overlap with the scope differences analyzed here, we use an elegant logical device in order to neutralize the scope interactions between "$\exists$ and $\neg$": instead of the operator **F**, we use **Fn**.

The intuitive meaning of **Fn**p is: within n units of time from the evaluation instant, it will be true that p. More formally:

$$\mathcal{M}, t \vDash \mathbf{Fn}p \Leftrightarrow \exists t' > t \wedge dur(t, t', n) \wedge M, t' \vDash p$$

Here, $dur(t, t', n)$ means that the temporal distance between t and t' is n units. Therefore, the operator **Fn** presupposes a metric on the structure of instants of time. The scope differences between the existential quantifier and negation are cancelled if the operator **Fn** is used because, assuming that time is everlasting, the following clauses are equivalent:

- $\mathcal{M}, t \vDash \mathbf{Fn}\neg p \Leftrightarrow \exists t' > t \wedge dur(t, t', n) \wedge M, t' \vDash \neg p$
- $\mathcal{M}, t \vDash \neg\mathbf{Fn}p \Leftrightarrow \neg\exists t' > t \wedge dur(t, t', n) \wedge M, t' \vDash p$

The first clause refers to the future instant t' at which it is false that p. The second clause is logically equivalent to $\forall t' > t(dur(t, t', n) \Rightarrow \mathcal{M}, t' \vDash \neg p)$. But the condition $dur(t, t', n)$ restricts all instants to just one; that is, to the instant that is at n units from t. So the two clauses are equivalent.

For universalism, this equivalence does not hold. Within Peircean semantics, for instance, we have that:

- $\mathcal{M}, t \vDash \neg\mathbf{Fn}p \Leftrightarrow \exists h \in \mathcal{H}_t, \exists t' > t, dur(t, t', n) \wedge \mathcal{M}, t'/h \nvDash p$
- $\mathcal{M}, t \vDash \mathbf{Fn}\neg p \Leftrightarrow \forall h \in \mathcal{H}_t, \exists t' > t, dur(t, t', n) \wedge \mathcal{M}, t'/h \vDash \neg p$

where it is evident that the two clauses are not equivalent. In this case, negation affects the universal quantifier on histories.

The use of operator **Fn** instead of **F** thus allows us to better compare universalist and linearist views, since it cancels the differences of scope with respect to the existential quantification on times, preserving the differences of scope with respect to the universal quantifier on histories.

However, there is an additional complication. Until now, we considered classical semantical frameworks, wherein external negation and meta-theoretical negation coincide. Nevertheless, some universalist approaches, such as *supervaluationism*,

deny this equivalence. As it is well known, in temporal supervaluationist semantics, the evaluation is not compositional.

We have:

$\mathcal{M}, t \vDash^{\mathsf{SUP}} \neg\mathbf{Fn}p \Leftrightarrow \forall h \in H_t, \mathcal{M}, h/t \vDash \neg\mathbf{Fn}p$ which means in turn:
$\mathcal{M}, t \vDash^{\mathsf{SUP}} \neg\mathbf{Fn}p \Leftrightarrow \forall h \in H_t, \mathcal{M}, h/t \nvDash \mathbf{Fn}p$ that is:
$\mathcal{M}, t \vDash^{\mathsf{SUP}} \neg\mathbf{Fn}p \Leftrightarrow \forall h \in H_t, \neg\exists t' > t, dur(t, t', n), h/t' \vDash p$ or
$\mathcal{M}, t \vDash^{\mathsf{SUP}} \neg\mathbf{Fn}p \Leftrightarrow \forall h \in H_t, \forall t' > t, dur(t, t', n), h/t' \vDash \neg p$

On the other hand, the supervaluationist interpretation of $\mathbf{Fn}\neg p$ is as follows:

$$\mathcal{M}, t \vDash^{\mathsf{SUP}} \mathbf{Fn}\neg p \Leftrightarrow \forall h \in H_t, \mathcal{M}, h/t \vDash \mathbf{Fn}\neg p$$

that is

$$\mathcal{M}, t \vDash^{\mathsf{SUP}} \mathbf{Fn}\neg p \Leftrightarrow \forall h \in H_t, \exists t' > t, dur(t, t', n), h/t' \vDash \neg p$$

But it is easy to realize that the conditions

$$\forall h \in H_t, \exists t' > t, dur(t, t', n), h/t' \vDash \neg p$$

and

$$\forall h \in H_t, \forall t' > t, dur(t, t', n), h/t' \vDash \neg p$$

are equivalent, given the meaning of parameter *dur*, which allows shrinking the domain of instants to just the class of instants that are, in the respective histories, at the same temporal distance from the point of evaluation.

Supervaluationism thus seems to be able to account for both the universalist intuition and the scopelessness of *will*.[2] However, even supervaluationism has some drawbacks. First, its semantics is not compositional (cf. Thomason (1970)); second, and this point is particularly relevant here, supervaluationism makes a distinction between falsity and being untrue at the post-semantic level (even though not at the semantic level).[3] It is well known that supervaluationism, particularly in MacFarlane's fashion, splits the classical function of truth in two: the disquotational role is tied to the object language truth predicate; the role that connects truth with pragmatics is linked to the concept of super-truth. Consider, for instance,

(13) $\mathcal{M}, t/h \vDash \neg\mathbf{F_1}\varphi$
(14) $\mathcal{M}, t/h \nvDash \mathbf{F_1}\varphi$[4]

[2] This is, for instance, MacFarlane's opinion. See MacFarlane (2014, pp. 219–220).
[3] We want to thank an anonymous referee for raising this issue.
[4] Here, $\mathbf{F_1}$ is a convenient way to formalize "tomorrow".

Semantically, we have that (13) is equivalent to (14). But what does happen when we want to construe (13) and (14) at the post-semantical level? It is easy to realize that $\mathcal{M}, t \not\models^{\mathsf{SUP}} \mathbf{F_1}\varphi \Leftrightarrow \mathcal{M}, t \models^{\mathsf{SUP}} \mathbf{F_1}\neg\varphi$. In other words, supervaluationism distinguishes between falsity and not being true. If we suppose that the sentences of natural language corresponding to (13) and (14) are, respectively, (15) and (16)

(15) It will not rain tomorrow.
(16) It is not true that it will rain tomorrow.

it is clear that supervaluationism also has its own problems with the negation of future-tense sentences. Perhaps, there can be ways to operate on the contexts in order to get the equivalence of (13) and (14) but, without particular specifications – that is in Thomason's version of supervaluationism – this is a problem.

Finally, let us provide another model of universalist semantics that does *not* use the logical device of supervaluations. In a nutshell, the idea is that a future-tense sentence is true if and only if it is true in all histories; it is false if it is false in all histories and it is untrue if it is false in at least one history (analogously, it is unfalse if it is true in at least one history). Formally:

$$\mathcal{M}, t \models^{\mathsf{CL}} \mathbf{F}p \Leftrightarrow \forall h \exists t' > t, h/t' \models p$$
$$\mathcal{M}, t \not\models^{\mathsf{CL}} \mathbf{F}p \Leftrightarrow \exists h \exists t' > t, h/t' \not\models p$$
$$\mathcal{M}, t \dashv^{\mathsf{CL}} \mathbf{F}p \Leftrightarrow \forall h \exists t' > t, h/t' \not\models p$$
$$\mathcal{M}, t \not\dashv^{\mathsf{CL}} \mathbf{F}p \Leftrightarrow \exists h \exists t' > t, h/t' \models p$$

This framework shares some features with Peirceanism – since it does not use supervaluations – but it does not admit bivalence. One of its advantages over supervaluationism is that this semantics is compositional. However, unlike supervaluationism, it has the problem of the scope of negation:

- $\mathcal{M}, t \models^{\mathsf{CL}} \mathbf{F}\neg p \Rightarrow \mathcal{M}, t \models^{\mathsf{CL}} \neg\mathbf{F}p$
- $\mathcal{M}, t \models^{\mathsf{CL}} \neg\mathbf{F}p \not\Rightarrow \mathcal{M}, t \models^{\mathsf{CL}} \mathbf{F}\neg p$

In other terms, in this semantics, the "export" principle for negation holds but not its converse. Moreover, as in the case of supervaluationism, it is not able to account for the intuitive equivalence of (13), (14). In particular,

$\mathcal{M}, t \models^{\mathbf{CL}} \neg\mathbf{Fn}p \Leftrightarrow \mathcal{M}, t \not\models^{\mathbf{CL}} \mathbf{Fn}p$ holds. However, even though we have that

$$\mathcal{M}, t \dashv^{\mathbf{CL}} \mathbf{Fn}p \Rightarrow \mathcal{M}, t \models^{\mathbf{CL}} \neg\mathbf{Fn}p,$$

, we also have that

$$\mathcal{M}, t \models^{\mathbf{CL}} \neg\mathbf{Fn}p \not\Rightarrow \mathcal{M}, t \dashv^{\mathbf{CL}} \mathbf{Fn}p.$$

.

In this paper, we will adopt this last universalist framework because it is compositional and because it can be modified in order to solve the problem of the interaction between *will* and negation.

Summing up, the claim according to which, within a universalist semantics, *will* is not scopeless must be specified. First, even within linearist semantics, *will* is not scopeless *per se*; it becomes scopeless when we use a metric future operator. Secondarily, supervaluationism is a universalist semantics in which **Fn** is scopeless. However, in this semantics, it is supertrue that $\neg\varphi$ does not entail that it is not supertrue that φ. And third, we have seen that for a nonbivalent semantics of Peircean inspiration, **Fn** is not scopeless. It is the mutual interaction of many logical features that gives rise to the scopelessness phenomenon.

4 Quantifiers and future

It seems that universalist theories cannot account for the scopelessness of *will* with respect to negation. However, it will be shown in this section that linearist theories cannot account for the fact that *will* has scope interactions with quantifiers.[5] Take for example indefinite noun phrases (NPs), that are usually formalized through the existential quantifier. Suppose that a speaker is providing driving directions. They say:

(15) When you turn the corner, you will see a yellow house.

(15) seems to state that there is a specific house the addressee will see. However, suppose that someone is explaining the rules of a lottery and says:

(16) Ten tickets will win a prize in this lottery.

In the most natural reading, (16) does not state that there are ten *specific* tickets that will be prized but that *some set or other* of ten tickets will be prized. In this case, *ten tickets* is a "non-specific" indefinite NP. The difference between *specific* and *non-specific* readings of indefinite NPs is well-known: these readings emerge when indefinite NPs interact with intensional operators:

(17) I think that John is dating a woman.
(18) Mary wants to marry a rich man.

(17) can mean either that there is a particular woman that the person thinks John is dating or they think John is dating some woman or other. Analogously, (18) can mean either that there is a particular rich man who Mary wants to marry or that Mary wants to marry any rich man. Usually, this distinction is interpreted based on

[5] The argument of this section is very similar to that advanced by Todd (2021), Sect. 3.4.

scope distinctions of the indefinite NP with respect to the intensional operator. It is therefore natural to extend this interpretation to the future-tense. For example:

(19) A ticket will win the lottery.

(19) seems to have two readings – specific and non-specific – which can be formalized as follows:

(19*) $\exists x(T(x) \wedge \mathbf{Fn}W(x))$
(19**) $\mathbf{Fn}(\exists x(T(x) \wedge W(x)))$

where $T(x)$ is the predicate "is a ticket" and $W(x)$ the predicate "win the lottery." Actually, for our purpose, we can assume that the existential quantifier has the set of the tickets as domain so that we can drop the predicate $T(x)$.

Semantically, the apparatus of possible worlds is used to interpret the difference between specific and non-specific NPs. For example, we can say that, in the specific reading of (18), there is a particular man that Mary marries in every possible world compatible with her desires; in the non-specific reading, for every world compatible with Mary's desires, there is a (potentially different) man she marries. We can tell the same story about *will* supposing that it quantifies over possible histories. In the specific reading (19*) there is a particular ticket that wins in every history open at the moment of evaluation, while in the non-specific reading (19**), for every history stemming from the moment of evaluation, there is a (potentially different) ticket that wins at an instant distant n units of time.[6]

Scope interactions between *will* and quantified NPs foster the universalist view. If *will* selected only one future history, there would be no difference between $\exists x\mathbf{Fn}P(x)$ and $\mathbf{Fn}\exists xP(x)$.[7] Indeed, if the two formulas are evaluated on a single history, they have equivalent truth conditions. The first one is true if there is an object that, in n units of time, will be P, while the second is true if, in n units of time, there will be an object that is P.

Linearist semantics predicts that the future operator is scopeless with respect to the existential quantifier. This is a problem because sentences such as (15), (16) and (19) demonstrate that this is not true. We do hear a difference in meaning between sentences such as (15), (16) and we can clearly discern the two readings of (19).

[6] Our examples concern indefinite NPs because scope interactions with intensional operators are more evident. However, similar differences also emerge with definite NPs:

(i) The ticket that will be drawn first will win the lottery.

The most natural reading of (i) is that, in every future branch, there is a ticket that will be drawn first and that that ticket wins the lottery. However, tickets can vary from branch to branch. Thus, the preferential reading of (i) is non-specific. Nevertheless, as in the cases of the other intensional operators, definite NPs have non-specific readings only when they contain relative sentences or pronouns. Since this complicates things, we stick to indefinite NPs.

[7] In fact, a difference in truth conditions would appear if the domain of quantification at the instant of the valuation t differed from that at instant $t + n$. Moreover, as pointed out by Todd (2020), fn 5–6, every semantics of the future must allow a scope distinction between $\neg\mathbf{Fn}\varphi$ and $\mathbf{Fn}\neg\varphi$ if time ends prior than $t + n$. In that case, any sentence having the form $\neg\mathbf{Fn}\varphi$ is true while any sentence having the form $\mathbf{Fn}\neg\varphi$

Todd's error theory seems to have a similar problem. Recall that Todd explains the fact that we do not hear the scope difference between $\neg\mathbf{Fn}\varphi$ and $\mathbf{Fn}\neg\varphi$ because we implicitly assume that there is a unique actual history of the world. This is such an entrenched assumption that we do not hear the difference even in contexts that should make it appear. As a consequence, we should hear no difference between (15) and (16) and we should not hear the difference between the two readings of (19). However, this is not the case: we do hear these differences.

We believe that this argument is sound against TRL forms of linearism. What about the supervaluationist semantics? Is Supervaluationism able to account the distinction between a specific and non-specific construal of (19).[8] Consider that, in the following, we discuss only the "classical" supervaluationist view advocated by Thomason (1970, 1984); therefore, we do not take into account other forms of supervaluationism – of a specific stripe – as that proposed and defended by Cariani and Santorio (2018) and Cariani (2021).

Supervaluations are, as it is well known, universal quantifications on *precisifications*; in Thomason's view, the precisifications are histories. Now, the specific reading of (19) is

$$\mathcal{M}, t \vDash^{\mathsf{SUP}} \exists x(\mathbf{Fn}W(x))$$

that is, in every history (viz. precisification) there exists a ticket that, at a certain instant in the future, will win. The non-specific reading is

$$\mathcal{M}, t \vDash^{\mathsf{SUP}} \mathbf{Fn}(\exists x W(x))$$

that is, in every history (viz. precisification) it is true that at a certain instant in the future, there exists a winning ticket. It is easy to realize that, from the classical supervaluationist point of view, the two formulas are logically equivalent. In fact, since their equivalence is true with respect to every history, it is also super-true. We have that $\mathcal{M}, t/h \vDash \exists x(\mathbf{Fn}W(x))$ is equivalent to $\mathcal{M}, t/h \vDash \mathbf{Fn}(\exists x W(x))$, for any instant of time and any history. Thus, we get $\mathcal{M}, t/h \vDash \exists x(\mathbf{Fn}W(x)) \leftrightarrow \mathbf{Fn}(\exists x W(x))$. But since this is true for an arbitrary history, it is true in every history, and therefore it is super-true.

For a further demonstration, let us take an arbitrary model with two histories (h_1 and h_2) in which, for the sake of simplicity, in h_1 ticket n. 12 is the winning one whereas in h_2, ticket n. 24 is the lucky one. Now, this model makes $\mathbf{Fn}(\exists x W(x))$ true in every history ; but, on the other hand, the model also makes $\exists x\mathbf{Fn}(Wx)$ true in every history. That is, both $\mathbf{Fn}(\exists x W(x))$ and $\exists x\mathbf{Fn}(Wx)$ are supertue. Since the model is arbitrarily chose, one can generalize and, thus, establish the equivalence.

Footnote 7 (continued)
is false. Again, to avoid problems orthogonal to what we are discussing here, we will suppose that the domain remains constant over time and that time has no end. In such a situation, the difference between the linearist and the universalist view becomes apparent.

[8] Thanks to an anonymous referee for having emphasized this point.

In the end, in order to appreciate how the classical supervaluationism is not able to account the intuitive difference between the two readings, one can drop the quantifiers taking into account just two tickets, *a* and *b*. Thus, let *Wa* and *Wb* be the sentence stating, respectively, "ticket *a* wins" and "ticket *b* wins". Even in this case, we have the two readings:

– $\mathbf{Fn}(Wa \vee Wb)$
– $\mathbf{Fn}(Wa) \vee \mathbf{Fn}(Wb)$

Here, again, according to Thomason's supervaluationism, the two formulas are equivalent. In fact, this is one of the reason that motivates a supervaluationist framework; this semantics allows to validate not only that it is true that in the future there will be or there will not be a sea-battle but also that either it is true that there will be a sea-battle or it is true that there will be no sea-battle. We conclude that at least classical supervaluationism also has problems in accounting the twofold reading of (19).

Advocates of linear semantics might respond that the difference we hear between the two readings of (19) is not due to the interaction between the universal quantifier over histories and the existential quantifier of the NP but due to an *epistemic* difference. On this view, the "specific" reading of the indefinite in (19) would correspond to cases in which we know which the winning ticket is, while the "non-specific" reading would emerge when we do not know the winning ticket. In the latter case, there *is* a particular ticket that will win, but we do not know which it is.

We do not believe that the difference between the two readings of (19) can be reduced to an epistemic difference. Suppose, for instance, that a ticket is drawn and put into an urn. Suppose further that nobody knows which this ticket is because it has been drawn by a machine. Someone says:

(20) A ticket will win the lottery. It's the ticket in this urn.

In (20), the indefinite NP seems to have a *specific* reading. There is a specific ticket that will win: it's the one in the urn. Sentences such as (20) suggest that the specific reading cannot be related to situations in which we do not know the referred object. This is also true of other intensional operators: I can know that there is a particular man who Mary wants to marry without knowing who he is. In such a case, (18) has a specific reading even though the referent is not known. Hence, the difference between the two readings of (19) is really a scope difference.

It seems that we have reached an impasse. The behavior of *will* toward negation seems to favour linearism. In contrast, the behavior of *will* toward quantified NPs seems to favour universalism. Is there some way to break the deadlock?

5 Partial predicates and negation

It is possible to recognize a structural similarity between the phenomena concerning the scope interactions between negation and future operator and the contexts in which vague predicates occur. Similarities pertain to two dimensions: non-bivalence and the scopelessness of negation.

According to a widespread line of thought, the semantics of vague predicates suggests the dropping of bivalence. Suppose that Arthur has little hair. It seems natural to say that it is neither true that Arthur is bald nor that he is not bald. The analogy with future contingents is straightforward. The openness of the future has suggested the idea that future contingents are neither true nor false *simpliciter*. According to this line of thought, if Emma is free to go to the party tomorrow, it is not now true that she will go to the party tomorrow and it is not now true that she will not go to the party tomorrow.

The second dimension of the analogy between future contingents and vague predicates regards the scope interactions with negation. Vague predicates seem to be scopeless with respect to negation. For instance:

(21) Arthur is not bald.

(21) does not have two interpretations. It means neither that Arthur has hair nor that it is untrue that he is bald – meaning that Arthur either has hair or is in the mid-zone between those who have hair and those who do not have it. (21) has only one interpretation: Arthur has hair. Our hypothesis is that **Fn** functions as vague predicates do. When we negate a future-tense sentence, we state that the corresponding affirmative sentence is false (not that it is either false or devoid of truth value). Hence, the negation of a future-tense sentence must always be interpreted as $\mathbf{Fn}\neg\varphi$.

Let us explore this in detail. We will assume here the theory of partial predicates of Soames (1999). A partial predicate is a predicate for which sufficient conditions for the predicate's holding and sufficient conditions for its not holding are provided, but no set of conditions that are individually necessary and jointly sufficient for the predicate to hold is provided. Soames uses the example of the invented predicate *smidget*, which applies to persons with height lower than h_1 and does not apply to persons with height over h_2, but for which no instruction is given for persons with height between h_1 and h_2.

The set of individuals to which the predicate applies is its extension; the set of individuals to which the predicate does not apply is its anti-extension. However, there is a set of individuals in the domain that belong neither to the extension nor to the anti-extension of the predicate.

Soames says that for one of these in-between persons, named "Mr. Smallman," we should reject both the claim that Mr. Smallman is a smidget and the claim that Mr. Smallman is not a smidget. Rejection does not mean that we can deny both that Mr. Smallman is a midget and that he is not a smidget but only that we can assert neither that he is a smidget nor that he is not a smidget. In Soames' words:

> We can say, if we like, that the predicate 'smidget' is *undefined* for individuals in the intermediate range and hence that the corresponding assertions and their negations are *ungrounded*. However, if we say this, we must *not* conclude that an individual for which the predicate is *undefined* is an individual the predicate *does not apply to* and that an *ungrounded* sentence (or proposition) is one that *is not true*. To assert something ungrounded is to make a kind of mistake. But the mistake is not correctly described as that of saying something untrue. Rather, it is in saying something that cannot, in the end, be sanctioned by the linguistic conventions that give one's words their meaning. (Soames (1999), p. 172)

Notice that when the predicate *smidget* is negated of an individual, it is meant that there are sufficient conditions to state that the predicate does not hold of that individual – and not that neither the assertion nor the negation of the predicate are grounded.

The instructions for applying the predicates *true* and *false* to sentences such as "*x* is a smidget" are similar: A speaker is licensed to say that "*x* is a smidget" is true (false) if they are allowed (are not allowed) to apply the predicate *smidget* to *x*. Hence, we are not licensed to say that a sentence such as "Mr. Smallman is a smidget" is true or false. Again, this does not mean that we can deny both that it is true that Mr. Smallman is a smidget and that it is false that Mr. Smallman is a smidget but only that none of these two assertions is allowed. Again, notice that when a speaker says that "*x* is a smidget" is false, they mean that the predicate *smidget* does not apply to *x* – not that the predicate neither applies to *x* nor does not apply.

This does not mean that we cannot make any remark on the use of the predicate *smidget*. In fact, in the previous paragraphs, we did make such remarks. Given a language L_1 that contains the predicate, we can use a language L_2 to establish the rules of its use: we can say which uses are ungrounded – so that no truth-value can be assigned – and we can also use metalinguistic negation.[9] However, in natural language, the distinction between language and metalanguage is blurred because we can use English both as language and meta-language. As Soames says: "English is really a hierarchy of languages" (p. 181). So, reacting to sentences such as:

[9] For the concept of metalinguistic negation, cfr. Horn (1989), ch. 6. For Horn, we have to draw a distinction "between the truth of a proposition and the assertability of a statement or sentence. ⋯ [E]ither truth or assertability can be affected by negation: it is up to the addressee to factor in the relevant contextual clues so as to determine just what the speaker intended to object to or deny in the use of a negative form at a given point in the conversation" (p. 377). In principle, any non-truth conditional aspect of a sentence can be targeted by meta-linguistic negation: presuppositions, conversational and conventional implicatures, connotation, tone, and even pronunciation. "Assertable, as employed by Grice, Dummett, and me, must be taken as elliptical for something like 'felicitously assertable' or 'appropriately assertable', where the adverbial hedge is broad enough to cover the wide range of examples under consideration" (p. 379). Horn's notion of meta-linguistic negation seems to us sufficiently broad to include our examples.

(22) Mr. Smallman is a smidget.
(23) Arthur is bald.

Given that Arthur is in the middle between the persons devoid of hair and those having hair, we can comment "I wouldn't say that," "We cannot say that." Alternatively, we might resort to *metalinguistic* negation and say sentences such as "It is not true that Arthur is bald even though it is not false that he is bald either," and even "Arthur neither bald nor not-bald." In these cases, we use English as a metalanguage to highlight the inappropriateness of both attributing and not attributing the predicate "bald" to Arthur. In other words, we are not saying that Arthur is not bald or that it is not true that Arthur is bald (intending *not* as a linguistic negation). If this were what we are intending, we would mean that Arthur has hair and that it false that he is bald. Instead, we are saying that we cannot predicate "bald" of Arthur and that we cannot negate this predicate of this individual. Moreover, we are saying that we cannot assign a truth value to this sentence. However, metalinguistic negation is obviously less accessible than linguistic negation. In general, all metalinguistic comments require a reflection on the usage rules of a word and then tend to be made only when the use of a word is problematic, as in (22) and (23).

Soames developed his theory with vague predicates and the Liar's paradox in mind, and he does not extend it to future contingents. Nevertheless, not only is this extension possible but it has already been investigated in literature by Tweedale (2004). Tweedale works within the metalinguistic framework of Thomason (1970) and maintains that the assertion of **Fn***p* is correct only if *p* is true in every future history departing from the evaluation moment; the assertion of **Fn**¬*p* is correct only if *p* is false in every future history departing form the evaluation moment; neither the assertion of **Fn***p* nor the assertion of **Fn**¬*p* are correct when *p* is true in the future of some histories and false in others. For instance, neither the claim that there will be a sea battle tomorrow nor the claim that there will not be a sea battle tomorrow are correct. However, this does not mean that we are allowed to deny that there will be a sea battle tomorrow or that there will not be a sea battle tomorrow. This is because, when a future-tense sentence is negated, we mean that there are sufficient conditions to state that something will *not* occur in the future – not that neither the assertion nor the negation of a future-tense sentence are allowed. This parallels the case of *smidget* and *bald*. We can now explain why we interpret sentence (1):

(1) It will not rain tomorrow

as meaning that there will not be rain, however the world unfolds: (1) is usually interpreted as meaning that the sentence "It rains" is false in the future of every history from the moment of utterance. In other words, we tend to interpret (1) as **Fn**¬*p* rather than ¬**Fn***p*.[10]

[10] For a similar idea, cf. Copley (2009), pp. 52–54.

Also, in this case, this does not mean that we cannot have access to the metalinguistic level. Consider the following sentence:

(24) There will be a sea battle tomorrow.

While reacting to it, we can make comments similar to those in reaction to (22) and (23). We could say something like "I wouldn't say that" or "We cannot say that." Alternatively, we might resort to *metalinguistic* negation and say something like "It is not true that there will be a sea battle tomorrow (though it is not false either)" or even "Neither will there be a sea battle tomorrow nor there will there not be a sea battle tomorrow: we cannot say any of these two things." In this case, we are commenting on the appropriateness of (24): given that neither (24) nor its *linguistic* negation are correct, we cannot state neither (24) nor its negation. We can use *metalinguistic* negation to state this situation. Moreover, we cannot assign a truth value to this sentence. Again, we can use metalinguistic negation to state this. However, metalinguistic negation is much less accessible than linguistic negation and requires a reflection on the rules of use of the future operator, so it tends to be used only in problematic cases such as the comments on the assertion of (24). In normal cases, the negation is always interpreted as linguistic.

A theory as the one just laid out can account for the behavior of *will* with respect to negation without stipulating that one history is privileged over the others. In accordance with the radical view of the open future, we presuppose that none of the histories stemming from the present is *the* real history. The behavior of *will* is explained by means of the partiality of its truth conditions, which are silent about the intermediate cases.[11]

6 A general tendency from contradictory to contrary?

There are several other natural language constructions in which negation more or less markedly tends to scope above a universal quantifier over worlds or individuals. For instance, this happens with counterfacuals. David Lewis claims that:

(25) If Bizet and Verdi were compatriots, Bizet would not be Italian

has two readings in his semantics. When negation takes narrow scope ($p \mathrel{\Box\!\!\rightarrow} \neg q$), (25) is false because not in every world most similar to the actual Bizet and Verdi are compatriots Bizet is not Italian (i.e. French). By contrast, when negation takes wide scope ($\neg(p \mathrel{\Box\!\!\rightarrow} q)$), (25) is true because in at least one of the most similar

[11] One might ask if the proposed semantics validates the principle of excluded middle: "Tomorrow there will or there will not be a sea battle." Scholars do not agree on this matter. According to Soames (1999) such a principle is not validated; whereas according to Tweedale (2004) and Copley (2009), it is validated. To keep this paper self-contained, we will not deal with this principle and instead focus on the relationship between *will* and negation.

worlds in which Bizet and Verdi are compatriots Bizet is French (and therefore not Italian). These truth conditions are clearly similar to those that the Peirceans gives to the formulas $\mathbf{Fn}\neg\varphi$ and $\neg\mathbf{Fn}\varphi$. However, Lewis himself acknowledges that we cannot hear the two readings of (25) (cfr. (Lewis, 1973), p. 80): only the reading $\forall\neg$ seems available.

Generics present analogous problems:

(26) Mammals do not lay eggs.

Supposing that (26) should be interpreted through a quantifier on situations or individuals **Gn**, (26) would have two readings, depending on whether negation scopes under or above **Gn**. However, only the reading $\mathbf{Gn}\neg p$ seems to be available, whereas we cannot hear the wide scope reading $\neg\mathbf{Gn}p$: (cf. (Carlson, 1980), pp. 49–51).

As we have seen in Sect. 2, some epistemic and bouletic modals provide further cases:

(27) I do not believe that Ann will come
(28) I do not want that Ann comes

Only the narrow scope readings $\mathbf{B}\neg p$ and $\mathbf{W}\neg p$ of (27) and (28) seem to be available, while the wide scope readings $\neg\mathbf{B}p$ and $\neg\mathbf{W}p$ are impossible to get. As said above, the behaviour of negation in (27) and (28) has been called neg-raising. The problem of the interactions of counterfactuals, generics and some modals with negation is very similar to that of **Fn** and, also in these cases, we believe that a solution in terms of the partiality of truth conditions is very fruitful, even thought we cannot demonstrate this in detail.

According to Laurence Horn, neg-raising and the behavior of vague terms, counterfactuals, and generics with respect to negation are all phenomena connected to "the tendency for contradictory (apparent wide-scope) negation to be semantically or pragmatically strengthened to contrary readings whenever possible" (Horn (2015), p. 241). In other words, if we interpret these constructions as cases in which negation interacts with a universal quantifier on worlds or individuals, we tend to read these constructions as $\forall\neg$, while the reading $\neg\forall$ is difficult or impossible to obtain. Using the Aristotelian square of opposition, we can say that there is a general tendency to understand **O**-sentences as **E**-sentences. In this sense, Horn speaks of a "general tendency toward $\mathbf{O} > \mathbf{E}$ drift, as manifested by the northward movement of **O**-corner lexical items or collocations toward **E**" (p. 245). This tendency in turn would descend from another more general tendency – which Horn calls *MaxContrary* – to maximize contrary and, as a consequence, not to consider the middle cases between the two contraries. In Horn's words:

> [T]he members of a set A either homogeneously exhibit a property (…) or homogeneously exhibit the opposed property (…); the possibility that there might be an $a \in A$ in one camp and a $b \in A$ in the opposite camp is excluded

> from consideration. (…) Homogeneity, or indivisibility, strengthens apparent wide-scope sentential negation (…) into a contrary of the positive (…) by virtue of the nature of the implicitly quantified terms with which negation interacts, or rather fails to interact (Horn (2015), p. 254).

If the members of the set are considered homogeneous, then they all possess either the property P or the property $\neg P$. Under the assumption of homogeneity, the negation of a sentence containing an universal quantifier on the element of the set is naturally interpreted as $\forall\neg$ rather then $\neg\forall$. Indeed, if $\forall x P(x) \vee \forall x \neg P(x)$ is presupposed, $\neg\forall x P(x)$ implies $\forall x \neg P(x)$.

We believe that our theory is compatible with what Horn states. For Horn, MaxContrary is a pragmatic phenomenon. However, several pragmatic processes tend to semantize and lexicalize. What is only a cancellable pragmatic inference at the beginning can become part of the lexical meaning. We believe that this is the case of the future. If there really is a tendency to maximize contraries, then the partiality of truth conditions would be the final act, the extreme case of this tendency: the intermediate cases would not only be neglected but also not even considered in the truth conditions and therefore excluded from the meaning of certain linguistic constructions. The reading $\neg\forall$ would not only be difficult to hear but impossible – at least, at the linguistic level; at the metalinguistic level, some kind of negation is always available. Neg-raising and **Fn** would be two stages of the same tendency, where the latter would be the radicalization of the process already ongoing in the former. In fact, with some of the linguistic constructions listed above, such as counterfactuals and generics, this process might have already come to an end and wide-scope negation could be no longer available, except at the metalinguistic level.[12]

Todd also refers to the neg-raising phenomena in support of his thesis. He maintains that we do not hear the wide-scope reading because we (mistakenly) interpret future-tense sentences with respect to only one history. In this history, **¬Fn** and **Fn¬** are equivalent and the difference between wide and narrow scope readings disappears.

However, our theory regarding *will* is more in keeping with neg-raising than Todd's. The tendency to interpret **¬want** (p) as **want**($\neg p$) not does not depend on

[12] Cariani (2021), Sect. 4.7, building on Winans (2016), argues that there are remarkable differences between *will* and neg-raisers. For instance, the wide scope reading of the negation is possible to achieve with neg-raisers in certain contexts (especially if they are pronounced with a certain intonation) but not with *will*. Furthermore, the excluded middle inference of ordinary neg-raisers does not project out of questions whereas *will* excluded middle does. For example,

(i) Does John think that Mary is home?

(ii) Will Mary be home?

(i) does not license the the inference that John has an opinion one way or the other, while (ii) does license the inference that either Mary will be home or she will not. These are important remarks. However, if we suppose that the tendency to MaxContrary is still pragmatic in the case of neg-raisers whereas is lexicalized in the case of *will*, we can think that the wide scope reading of negation is difficult but not impossible to obtain in the case of neg-raisers while is not allowed in the case of *will*. This view is supported by the fact that other linguistic constructions, such as counterfactuals and generics, seem to pattern with *will* rather than with neg-raisers.

our tendency to restrict our interpretation of the modal to just one world in which p is true or false. Rather, we tend to consider only two cases: the cases in which p is true in *every* world compatible with the desires of the subject and the case in which $\neg p$ is true in *every* world compatible with the desires of the subject. In other words, we tend not to consider intermediate cases in which both p and $\neg p$ are true in some worlds. Analogous remarks apply to other neg-raisers such as "to believe." As Horn states, neg-raising is connected to the cases in which we consider $\forall x P(x)$ and $\forall x \neg P(x)$ – i.e., **A** and **O** – as the only two possible cases. Neg-raising has to do with universal quantifiers. This is in line with our view about future-tense and negation: we consider only the cases in which p is true in *every* history and false in *every* history, and we ignore intermediate cases. Indeed, the rules of language are silent about them. By contrast, neg-raising seems to be at odds with Todd's view because he believes that common-sense presupposes the existence of a privileged history with respect to which future-tense sentences should be evaluated. *Will* would be scopeless because evaluation concerns just this history. Again, whatever the plausibility of this story regarding *will* might be, the same cannot be said about neg-raisers: *believe* is a neg-raiser because intermediate cases are ignored, not because common-sense presupposes that there is just one world with respect to which *believe* should be evaluated.

The behavior of *will* with respect to indefinite NPs provides further support to our thesis: neg-raisers are scopeless with respect to negation but not with respect to indefinite NPs (cf. (17) and (18) above). However, for ordinary contexts Todd's view predicts *will* to be scopeless with respect to these NPs as well. Finally, other scopeless linguistic constructions (such as, for instance, generics) are interpretable as cases in which intermediate cases are neglected, not as cases in which there is a privileged case. All these data suggest that our view, although has some similarities with Todd's, is preferable.

7 Conclusion

The behavior of *will* with respect to negation seems to favor the idea that we interpret future-tense with respect to only one history. Those who believe that the future is open and that there are many possible future histories must deal with this fact. A common reaction is to claim that, even though many histories depart from the present instant, one of them is privileged over the others. This idea comes in many versions. One can hold that there is a privileged history and it is determined which it is; or one can hold that there is a privileged history but it is indeterminate which it is; or one can hold that there is no privileged history but that it is commonly believed that there is one.

In this article, we have shown that, if partial truth conditions are possible, we can escape the conclusion that *will* must be interpreted with respect to only one history. The partiality of the truth conditions of *will* is not an isolated case, but it is mirrored in other linguistic phenomena, such as vague predicates, counterfactuals, and generics. Perhaps it is a radical expression of a general psychological tendency to maximize contraries.

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References

Barnes, E., & Cameron, R. (2009). The open future: Bivalence, determinism and ontology. *Philosophical Studies, 146*(2), 291.
Cariani, F. (2021). *The modal future: a theory of future-directed thought and talk*. Cambridge University Press.
Cariani, F., & Santorio, P. (2018). Will done better: Selection semantics, future credence, and indeterminacy. *Mind, 127*(505), 129–165.
Carlson, G. N. (1980). *Reference to Kinds in English*. New York and London: Garland Publishing.
Copley, B. (2009). *The semantics of the future*. New York: Routledge.
Horn, L. (1989). *A natural history of negation*. Chicago: The University of Chicago Press.
Horn, L. (2015). On the contrary: Disjunctive syllogism and pragmatic strengthening. In A. Koslow & A. Buchsbaum (Eds.), *The road to universal logic* (Vol. 1, pp. 241–265). Springer.
Horn, L. R. (1975). Neg-raising predicates: Toward an explanation. *CLS, 11,* 279–294.
Lewis, D. (1973). *Counterfactuals*. Malden and Oxford: Blackwell.
MacFarlane, J. (2014). *Assessment sensitivity: Relative truth and its applications*. OUP Oxford.
Malpass, A., & Wawer, J. (2012). A future for the thin red line. *Synthese, 188*(1), 117–142.
Øhrstrøm, P. (1981). Problems regarding the future operator in an indeterministic tense logic. *Danish Year-Book of Philosophy Kobenhavn, 18*, 81–95.
Øhrstrøm, P. (2009). In defence of the thin red line: A case for ockhamism. *Humana. Mente, 8,* 17–32.
Soames, S. (1999). *Understanding truth*. Oxford: Oxford University Press.
Thomason, R. H. (1970). Indeterminist time and truth-value gaps. *Theoria, 36*(3), 264–281.
Thomason, R. H. (1984). Combinations of tense and modality. In D., G. and F., G., editors, *Handbook of philosophical logic*, pages 135–165. Springer.
Todd, P. (2016). Future contingents are all false! on behalf of a russellian open future. *Mind, 125*(499), 775–798.
Todd, P. (2020). The problem of future contingents: Scoping out a solution. *Synthese, 197,* 5051–5072.
Todd, P. (2021). *The open future: Why future contingents are all false*. Oxford: Oxford University Press.
Tweedale, M. M. (2004). Future contingents and deflated truth-value gaps. *Noûs, 38*(2), 233–265.
Wawer, J. (2014). The truth about the future. *Erkenntnis, 79*(3), 365–401.
Wawer, J., & Malpass, A. (2020). Back to the actual future. *Synthese, 197*(5), 2193–2213.
Winans, L. (2016). *Inferences of will*. PhD thesis, UCLA.