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ORIGINAL RESEARCH

Assessing alternatives: the case of the presumptive future in Italian

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Abstract

In this paper, we study the distribution and interpretation of a non-temporal use of the future tense in Italian, called 'presumptive' or 'epistemic', which we label here PF. We first distinguish PF from its closest modal relatives, namely epistemic necessity/possibility/likelihood modals, as well as weak necessity modals. We then propose an account of PF in declaratives and interrogatives that treats it as a special comparative subjective likelihood modal, and test its empirical predictions. A theoretical lesson drawn from this detailed study of the semantics of PF is that semantics needs sharpened theoretical tools to be able to capture the fine-grained distinctions languages make when it comes to signaling modulated epistemic commitment to a proposition.

Keywords Future tense · Modality · Epistemic · Subjectivity

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1 Introduction

Languages use a variety of expressions to signal nuanced commitment to a proposition, such as epistemic modals (*Gianni may/must be home*), weak necessity modals (*Gianni ought to be home*), and likelihood adverbs (*Gianni is likely to be home*). In this paper, we argue that the non-temporal use of the future tense in Italian is one of the ways commitment can be modulated in this language. In our account, the non-temporal use of the future tense in Italian is similar to, yet different from, the modals mentioned above.[1]

The future tense in Italian has an ordinary temporal use, exemplified in (1).[2]

(1) Gianni **sarà** a casa domani.
Gianni be.FUT.3SG at home tomorrow
'Gianni will be at home tomorrow.'

This morphological form also has a non-temporal use, called here *the presumptive future* (PF), which allows co-occurrence with non-future temporal adverbs, exemplified in (2) and (3).[3]

(2) Gianni **sarà** a casa adesso.
Gianni be:FUT.3SG at home now
'Gianni is presumably home now.'

(3) Gianni **sarà** **stato** a casa ieri.
Gianni be:FUT.3SG be:PP.M.SG at home yesterday
'Gianni was presumably at home yesterday.'

As illustrated in (4) and (5), PF also occurs in constituent and polar interrogatives.

(4) *It's 3am. Someone knocks at the door.*
Chi **sarà**?
who be:FUT.3SG
'Who might it be?'

[1] Verbs in Italian have (i) a synthetic future that has a temporal future reading (the *futuro semplice*), and (ii) a periphrastic future form (the *futuro anteriore*), constructed with the future of the auxiliary *essere* 'to be' or *avere*, 'to have', followed by the past participle of the verb. (The auxiliary is selected by the verb for reasons that are entirely independent of the issues this paper is concerned with.) The temporal interpretation of the latter is the 'past in the future' interpretation, as in *Alle sette avremo già mangiato* 'By 7 we will have already eaten'; the non-temporal interpretation is the PF interpretation and it is the focus of this paper. The PF interpretation becomes the only available interpretation when the future (whether *future semplice* or *futuro anteriore*) co-occurs with a non-future temporal adverb. We translate PF into English sometimes by epistemic *might* or *must*, sometimes by the adverb *presumably*, and sometimes by the modal *would*, depending on what best captures our intuition concerning its contribution. As we will see below, none of these translations captures the meaning of PF in all the cases we consider here. All instances of non-temporal future forms in the paper have been boldfaced for ease of reference.

[2] We will use the following abbreviations: 1 = first person, 2 = second person, 3= third person, M = masculine, F = feminine, SG = singular, PL = plural, FUT = future, PST = past, PRS = present, PP = past participle, GER = gerund, INF = infinitive, COND = conditional, SUBJ = subjunctive, IMPF = imperfect tense, IMP = imperative.

[3] Concerning the Italian data, unless indicated otherwise, the examples provided in the paper have been constructed by the authors. The judgments we report reflect the judgments of ten native speakers of Italian, all from Northern Italy.

(5) *Gianni left this morning.*
Sarà arrivato?
be:FUT.3SG arrive:PP.M.SG
'Might he have arrived?'

In the cases exemplified above, the future acquires a non-temporal flavor that has been labeled 'presumptive', 'epistemic' or 'evidential'. Because of the non-future adverbs, examples (2) and (3) can only receive a presumptive interpretation, according to which the speaker expresses, roughly speaking, her best guess with respect to Gianni's whereabouts.[4]

Other languages within and outside the Romance family that have similar but not necessarily identical non-temporal uses of the future are French, Spanish, Romanian, Dutch, Greek, and English. For earlier work see Fălăuş (2014), Fălăuş and Laca (2014), Frana and Menéndez-Benito (2015, 2019), Giannakidou and Mari (2013, 2017), Irimia (2010), Mari (2012), Mihoc (2014), Mihoc et al. (2019), Winans (2016), among others. We concentrate here on Italian, leaving a cross-linguistic comparison for another occasion.

In what follows, we differentiate PF from epistemic modals, simple likelihood modals, variable-force modals, and weak necessity modals in Sect. 2. We give our proposal for the semantics of PF and explore its consequences in Sect. 3. In our account, PF is a comparative subjective likelihood modal that imposes a restriction on the question under discussion. In Sect. 4, we discuss PF in interrogatives, and Sect. 5 concludes.[5]

2 Distinguishing PF from other modals

In this section we show that PF must be distinguished from epistemic necessity, epistemic possibility, likelihood predicates, weak necessity modals, and that it cannot be treated as a variable force epistemic modal either. We end the discussion by summarizing the empirical properties that an account of PF has to capture.

2.1 PF is different from epistemic necessity

Giannakidou and Mari (2017) argue that PF in Italian, as well as in Greek, Dutch and German, is synonymous with the epistemic necessity modal *must*. In this account, both PF and *must* are necessity modals that have an epistemic conversational background and a stereotypical ordering source. Furthermore, the epistemic modal base is subject to a condition called 'subjective nonveridicality': with respect to a proposition p and an anchor i, i's epistemic state must entail neither p nor $\neg p$.

[4] We assume, following Mari (2012), that the presumptive future reading is also available in sentences in which the future tense receives a future temporal interpretation, but will not argue this point here.

[5] The immediate antecedent of this paper is Ippolito and Farkas (2019). The discussion of the data in the present paper is wider and more detailed than in its predecessor. Moreover, our current account differs from our earlier one, an issue to which we come back in Sect. 3.

In this subsection we challenge the general claim that PF is synonymous with a universal epistemic modal. Any such account predicts that PF and the universal epistemic modal *dovere* in Italian have the same distribution and interpretation. We show below that this prediction is not verified, and therefore that PF and the universal necessity modal *dovere* must be distinguished analytically.

In what follows, we assume that PF sentences involve an operator, PF, that takes a proposition p in its scope. We call p the 'prejacent' of PF, and represent the semantic structure of such sentences as $PF(p)$.

Note first that in (6), while a doctor could felicitously report her inference about the patient's health on the basis of the available evidence by using the epistemic necessity modal *must/dovere*, an utterance with PF would sound odd in this context.

(6) DOCTOR- 1
Maria is at the doctor, who has reviewed her test results. She asks her doctor what is wrong with her. The doctor replies:

a. Deve essere narcolessia.
must:PRS.3SG be:INF narcolepsy
'It must be narcolepsy.'

b. #**Sarà** narcolessia.
be:FUT.3SG narcolepsy
'It would be narcolepsy.'

Intuitively, PF is inappropriate in this scenario because it suggests that the doctor is guessing rather than drawing an inference based on the (medical) evidence and information available.

Consider next the case in (7), modified from Mandelkern (2018). This example shows that when the speaker knows that the inference being drawn is true, *must/dovere* is acceptable, but PF is not.

(7) MATH
If the set of validities were decidable, then the halting problem would be decidable. The halting problem is not decidable. So:

L'insieme delle formule logicamente valide deve essere/
the set of.the formulae logically valid must:PRS.3SG be:INF
#**sarà** indecidibile.
be:FUT.3SG undecidable
'The set of validities must be undecidable.'

Next, note that there are also situations in which PF is acceptable while *must/dovere* is not. This is the case in the scenario exemplified in (8), in which the speaker has asserted lack of knowledge concerning p:

(8) IGNORANCE- 1
Where is Maria?

a. Non ne ho la più pallida idea. #Deve essere a
not of.it have:PRS-1SG the most faint idea must:PRS.3SG be:INF at
casa.
home
'I don't have the faintest idea. #She must be at home.'

b. Non ne ho la più pallida idea. **Sarà** a casa.
not of.it have:PRS-1SG the most faint idea be:FUT.3SG at home
'I don't have the faintest idea. She will be at home.'

Note that the Italian expression *non avere la più pallida idea*, 'not have the faintest idea', in (8) is idiomatic: by using it, the speaker in (8) emphatically asserts that she does not know the answer to the question she addresses. This is, of course, compatible with her having some ideas about Maria's whereabouts. This is precisely what is conveyed by (8-b): the speaker does not know where Maria is, but she has some ideas (having to do with Maria's daily routines, for instance) that support her guess that Maria is at home.[6]

Note next that PF and *must/dovere* behave differently in interrogative sentences too. We have seen above, in (4) and (5), that PF is appropriate in polar and constituent interrogatives. As illustrated in (9) and (10), *must/dovere* sounds odd in such sentences.

(9) *It is 3am. Someone knocks at the door.*
#Chi dev'essere?
who must:PRS.3SG be:INF
'Who must it be?'

(10) *Gianni left this morning.*
#Deve essere arrivato?
must:PRES.3SG be:INF arrive:PP.M.SG
'Must he have arrived?'

We have illustrated above both cases where epistemic necessity modals are acceptable but PF is not, and the reverse. On the basis of these data we conclude that PF should not be analyzed as an epistemic necessity operator.[7]

We turn below to a comparison of PF with possibility modals.

[6] While a reviewer found (8-b) infelicitous, the judgments we collected were clear: on a scale of acceptability from 1 to 7 (with 1 being the worst and 7 being the best), seven out of the ten native speakers of Italian we consulted gave (8-b) a score of 7, and the remaining three gave it a score of 5 or higher.

[7] A reviewer raises the possibility that the difference between PF and *must/dovere* is that, while the latter requires a salient argument (cf. Mandelkern 2018), PF is ruled out in contexts where a salient argument is given. The felicity of examples like (i) show that PF is acceptable in contexts where an argument for the assertability of the PF sentence is given.

(i) a. Where is Livia?
b. La macchina non è ancora in garage. **Sarà** ancora in ufficio.
the car not be:PRS.3SG yet in garage. be:FUT.3SG still in office
'The car is not in the garage yet. Presumably she's still at the office.'

2.2 PF differs from epistemic possibility

We distinguish now PF from the epistemic possibility modal *might/potere*. Example (11) shows that a speaker can use an epistemic possibility modal but not PF to report a state in which she entertains multiple epistemic possibilities.

(11) MULTIPLE POSSIBILITIES
Where is Maria?

a. Sono le 5. Potrebbe essere a casa e potrebbe
be:PRS.3PL the 5 can:COND-PRS.3SG be:INF at home and can:COND-PRS.3SG
essere al lavoro.
be:INF at work
'It's 5 o'clock. She might be at home and she might be at work.'

b. Sono le 5. #**Sarà** a casa e **sarà** al lavoro.
be:PRS.3PL the 5 be:FUT.3SG at home and be:FUT.3SG at work
'It's 5 o'clock. She will be at home and she will be at work'

Conversely, example (12) illustrates that when the speaker expresses high credence in the prejacent, PF is appropriate but the possibility modal is odd.

(12) BEST ALTERNATIVE
Where is Gianni?

a. Dove vuoi che sia! **Sarà** a casa.
where want:PRS-2SG that be:SUBJ-PRS.3SG be:FUT.3SG at home
'Where could he be! He would be home.'

b. Dove vuoi che sia! #Potrebbe essere a
where want:PRS-2SG that be:SUBJ-PRS.3SG can:COND-PRS.3SG be:INF at
casa.
home
'Where else could he be! #He might be home.'

Next, we show that PF differs from a likelihood predicate as well. An analysis that treats PF as synonymous with predicates like *likely/probable* can capture the fact that its force is somewhat stronger than epistemic possibility (as in the BEST ALTERNATIVE and MULTIPLE POSSIBILITIES scenarios), as well as the unacceptability of PF in the MATH case. Crucially, however, such an analysis cannot explain why PF is not appropriate in the DOCTOR scenario, a context in which, as (13) shows, a likelihood modal is appropriate.

(13) DOCTOR- 2
Maria is at the doctor, who has reviewed her test results. She asks her doctor what is wrong with her. The doctor replies:

È probabile che sia narcolessia.
be:PRS.3SG probable that be narcolepsy
'It's probably narcolepsy.'

The data discussed so far lead us to conclude that PF should be differentiated from epistemic necessity and epistemic possibility modals, and that it cannot be treated as synonymous with likelihood predicates either.

2.3 PF is not a variable-force modal

Pursuing the comparison with epistemic modals, Mari (2012) shows that, as illustrated in (14), PF exhibits a mixed behavior: PF can co-occur with strong adverbs like *certamente*, 'certainly', and have an interpretation close to that of a necessity modal, but it can also co-occur with weak adverbs like *forse*, 'maybe', and have an interpretation close to that of a possibility modal. (See Bertinetto (1979) and Pietrandrea (2005) for discussion.)

(14) a. Maria **sarà** forse a casa.
Maria be:FUT.3SG perhaps at home
'Maria might perhaps be at home.'
b. Maria **sarà** certamente a casa.
Maria be:FUT.3SG certainly at home
'Maria must certainly be at home.'

To address this puzzle, and following Matthewson et al. (2008), Mari (2012) proposes that PF is a variable-force modal. According to this view, PF existentially quantifies over a non empty set of worlds that can either be equal to or smaller than the set of accessible worlds, as shown in (15) from Mari (2012).

(15) $[\![\text{future}]\!]^{w,f,i} = \lambda p_{<s<it>>}.\lambda w.\lambda t \exists X[X \subseteq f(w) \wedge X \neq \varnothing \wedge \forall w' \in X(p(w',t))]$

In addition, in Mari's proposal, PF comes with a requirement that the speaker has indirect evidence in support of p.

Focusing only on the issue of the force of the modal and returning to the pair in (14), the lexical entry in (15) ensures that PF will be appropriate with an existential reading in case X is smaller than the set of accessible worlds ($f(w)$), as in (14-a); it will also be appropriate with a universal reading in case X equals $f(w)$, as in (14-b).

It is not clear, however, how this account addresses some of the questions we raised in the preceding two subsections. Abstracting away from the indirect evidence condition, if the context is what determines the force of the modal claim, then we would expect PF to be appropriate in the MULTIPLE POSSIBILITIES scenario, where it should receive an existential interpretation, as well as in the DOCTOR-type scenario, where it should receive a universal interpretation. Taking into account the indirect evidence condition does not solve the problem: PF is still infelicitous in the versions of the MULTIPLE POSSIBILITIES and DOCTOR-type scenarios in (16) and (17) below, where the indirect evidence condition is met.[8]

[8] The indirect evidence condition is met in (16) because the light in the kitchen can be taken as indirect evidence for Maria being home. In (17), the doctor's evidence is indirect because it is reported by the patient, rather than directly witnessed.

(16) MULTIPLE POSSIBILITIES
Where is Maria? The kitchen light is on but the car is not in the driveway.

a. Sono le 5. **#Sarà** a casa e **sarà** al lavoro.
be:PRS.3PL the 5 be:FUT.3SG at home and be:FUT.3SG at work
'It's 5 o'clock. She will be at home and she will be at work'

b. Sono le 5. Potrebbe essere a casa e potrebbe
be:PRS.3PL the 5 can:COND-PRS.3SG be:INF at home and can:COND-PRS.3SG
essere al lavoro.
be:INF at work
'It's 5 o'clock. She might be at home and she might be at work.'

(17) DOCTOR
Maria is at the doctor. She reports that she has a cold, cough, and high fever. The doctor says:

a. Deve essere la stessa influenza che ha colpito metà
must:PRS.3SG be:INF the same influenza that have:PRS.3SG hit:PP half
della popolazione.
of-the population
'It must be the same flu that has hit half of the population.'

b. **#Sarà** la stessa influenza che ha colpito metà della
be:FUT.3SG the same influenza that have:PRS.3SG hit:PP half of-the
popolazione.
population
'Intended reading: It is presumably the same flu that has hit half of the population.'

In (16) PF should be felicitous under its existential interpretation, while in (17) it should be felicitous under its universal interpretation. The infelicity of PF in these examples shows that the flexibility allowed by a variable-force analysis is not enough to capture the distribution of PF in Italian, even when coupled with an indirect evidence requirement.

We conclude that PF differs from epistemic necessity modals, epistemic possibility modals, and likelihood predicates such as *likely/probable*, and furthermore that its interpretation cannot be captured by a variable force epistemic modal account either.

2.4 PF is not a weak necessity modal

In this subsection we show that the distribution of PF differs from that of weak necessity modals, namely *should/ought to* in English and *dovrebbe* in Italian, despite overlap in some cases.

Weak necessity in Italian is expressed by combining the strong necessity modal *dovere*, 'has to/must', with the morphology that occurs in the consequent of a counterfactual conditional (the conditional mood).[9]

Let's begin with the similarities. Both PF and *dovrebbe* are infelicitous in the MATH and in the MULTIPLE POSSIBILITIES scenarios, as shown in (18) and (19) respectively.

[9] For discussion of this morphological pattern cross-linguistically, see von Fintel and Iatridou (2008).

(18) *If the set of validities were decidable, then the halting problem would be decidable. The halting problem is not decidable. So*:

#L'insieme delle formule logicamente valide dovrebbe essere
the-set of-the formulae logically valid must:COND-PRS.3SG be
indecidibile.
undecidable.
'The set of validities should be undecidable.'

(19) *Where is Maria?*

Sono le 5. #Dovrebbe essere a casa e
be:PRS.3PL the 5 must:COND-PRS.3SG be:INF at home and
dovrebbe essere al lavoro.
must:COND-PRS.3SG be:INF at work
'It's 5 o'clock. She should be at home and she should be at work.'

Yalcin (2016) treats English *should* and *ought to* as normality modals. According to his proposal, α *should F* means that it would be normal, all relevant things considered, for α to F. In this treatment, weak necessity modals are not epistemic. Following Veltman (1996), Yalcin takes the epistemic flavor of these modals to be the result of a default inference from what is normally the case to what is presumably the case.

There are, however, several contexts in which PF and weak necessity *dovrebbe* come apart. First, as shown in (20), PF differs from weak necessity in that only the latter is compatible with a counterfactual prejacent.

(20) a. Dovrei essere morta (ma non lo sono).
must:COND-PRS.1SG be:INF dead (but not it am)
'I should be dead but I am not.'

b. #Sarò morta (ma non lo sono).
be:FUT.1SG dead (but not it am)
'I will be dead (but I am not).'

Next, (21) shows that *dovrebbe*, unlike PF, is appropriate in the DOCTOR scenario.[10]

(21) *Maria is at the doctor, who has reviewed her test results. She asks her doctor what is wrong with her. The doctor replies*:

Dovrebbe essere narcolessia, ma prima di pronunciarmi
must:COND-PRS.3SG be:INF narcolepsy but before to pronounce:INF=me
vorrei che lei facesse un ulteriore esame
want:COND-1SG that she do:SUBJ-IMPF.3SG a further exam
endocrinologico.
endocrinological
'It should be narcolepsy. But before I give my opinion, I would like you(formal) to do a further endocrinological exam.'

[10] We are grateful to a reviewer for this example.

In (21) the use of *dovrebbe* suggests that the doctor is not sure about the diagnosis but has enough information to attempt one.

Note next that, as shown in (22), if the speaker has reliable evidence against the prejacent, a weak necessity modal is still appropriate, whereas PF is not. This is different from the non-counterfactuality requirement on PF since in the following example, the speaker is still open to the possibility that Maria is at home, as the expression *riproviamo*, 'let's try again', indicates.

(22) *Nobody is answering the phone at Maria's. Where is she?*

a. Strano, non risponde al telefono. Eppure dovrebbe
strange not answer:PRS.3SG at.the phone however must:COND.3SG
essere a casa. Riproviamo.
be:INF at home try:IMP-1PL.again
'That's strange, she is not answering the phone. However, she should be home. Let's try again.'

b. Strano, non risponde al telefono. #Eppure, **sarà** a casa.
strange not answer:PRS.3SG at.the phone however be:FUT.3SG at home
Riproviamo.
try:IMP-1PL.again
'That's strange, she is not answering the phone. However, she must be home. Let's try again.'

The BEST ALTERNATIVE scenario is another instance where PF and weak necessity modals differ: as shown in (23), PF is fine but *dovrebbe* is not.

(23) *Where is Gianni?*

Dove vuoi che sia! **Sarà** / #dovrebbe
where want:PRS-2SG that be:SUBJ-PRS.3SG be:FUT.3SG / must:COND.3SG
essere a casa.
be:INF at home
'Where could he be! He would be home.'

Thus, PF but not *dovrebbe*, can be used to express the speaker's 'best guess' concerning the answer to the question under discussion. These data suggest that despite similarities in distribution and interpretation, PF should be distinguished from weak necessity modals.

On the basis of these contrasts, and against our own earlier proposal in Ippolito and Farkas (2019), we argue that PF cannot be treated as a normality modal along the lines of the account proposed by Yalcin (2016) for English weak necessity modals. In our earlier proposal, PF statements involve an assessment of subjective likelihood based on what the evaluating agent considers to be normally the case. This account makes the wrong prediction relative to (22-b) above. In that example, we see that in the presence of strong contextual evidence against the prejacent, PF is not felicitous. This runs against what a normality account predicts, since strong evidence against p is nevertheless compatible with p being normally the case.

The empirical contrasts between PF and its closest modal relatives are summarized in the chart below.[11]

(24)

	DEC	INTERR	DOC	MATH	IGN	MULT-POSS	BEST-ALT
PF	✓	✓	#	#	✓	#	✓
dovere	✓	#	✓	✓	#	#	✓
potere	✓	✓	✓	#	✓	✓	#
dovrebbe	✓	#	✓	#	?	#	#

Our account of PF is developed in the next section.

3 Proposed analysis

In this section we first propose a semantics for PF in Sect. 3.1; in Sect. 3.2 we discuss its empirical coverage, and in Sect. 3.3 we investigate the status of the contribution of PF and discuss its interaction with negation before turning to PF in interrogatives in Sect. 4.

3.1 The semantics of PF

In the account we work out below, PF in Italian has the semantics of a special type of comparative subjective modal.

We propose that when a speaker uses a declarative sentence whose logical form is $PF(S)$, where S denotes a proposition p, the speaker commits to p having the highest degree of subjective likelihood among a set of contextually salient alternatives C. More precisely, $PF(S)$ presupposes that there is a highest ranked proposition in C and asserts that p is that proposition. $PF(S)$ is true just in case, relative to her doxastic state, the speaker takes p to be subjectively more likely than any of the alternatives in C. We take the subjective likelihood of p for an agent i at a time t relative to a world of evaluation w and a doxastic base D_i to be i's degree of credence at t that w is an element of p, established on the basis of D_i, where D_i is the set of worlds w' such that for every propositions p' such that i believes at t in w that $w \in p'$, $w' \in p'$.

Furthermore in our account, PF associates with focus in that the set of alternatives C is a subset of the focus semantic value of S. The constituent bearing a focused feature is marked by the diacritic F. Following Rooth (1992, 1996), we assume that this feature introduces the focus value of this constituent, i.e. the set of entities of the same type as the entity denoted by the phrase carrying the focus feature. The focus semantic value of the whole prejacent is the set of propositions obtained by substituting each of the elements in the focus value of the focused constituent for the semantic value of that constituent.

[11] The presence of the question mark for *dovrebbe* in IGNORANCE signals our uncertainty concerning the judgment in this case. A large scale collection of data is needed before one can reach robust generalizations concerning this modal in Italian. Since we are interested only in distinguishing PF from *dovrebbe*, which can be established on the basis of (20) and (21) above, the issue of the semantics of *dovrebbe* is beyond the scope of this paper. For relevant discussion, see Cariani (2013) and Yalcin (2016).

The truth conditions of $PF(S)$, where S denotes p, are given in (25).

(25) a. $[\![PF(S)_F]\!]^{g,w,t,c}$ is defined iff $[\![S_F]\!]^{g,w,t,c} \in C$ and there is a $q \in C$ s.t. $\forall r$: $r \in C$ and $r \neq q$, $q >_{i,t,D_i,w} r$.

b. If defined, $[\![PF(S)_F]\!]^{g,w,t,c} = 1$ iff $[\![S_F]\!]^{g,w,t,c}$ = the q s.t. [$\forall$r: $r \in C$ and $r \neq q$, $q >_{i,t,D_i,w} r$], where:

(i) $C \subseteq [\![S_F]\!]^f$ (where $[\![S_F]\!]^f$ is the focus semantic value of the prejacent)

(ii) i is a contextually bound variable; in default cases its value is the speaker in declaratives and the addressee in interrogatives;

(iii) for any propositions $p, q \in \mathcal{P}$(W): $p >_{i,t,D_i,w} q$ iff i's credence in p is greater than i's credence in q in w at t relative to D_i.

C is a salient, contextually restricted subset of $[\![S_F]\!]^f$, which includes the prejacent and at least some alternative in $[\![S_F]\!]^f$ other than the prejacent. Following Roberts (1996), among others, we take prosodic focus (marked by F) to be connected to the question under discussion (QUD), where the QUD is conceived as a set of propositions: for an assertion α to be congruent to the QUD, the set of its focal alternatives (or a contextually salient subset thereof) must be a subset of the QUD. Therefore, asserting $PF(S)$ is congruent to the QUD iff C is a subset of the QUD, i.e. only if $p \in$ QUD.

The essential difference between the semantics of PF given here and the proposal in Ippolito and Farkas (2019) is that, in the latter, worlds in the doxastic modal base of the evaluating agent were ordered relative to that agent's normality base while in the current account the relevant ordering is done based on the evaluative agent's subjective credence.

The proposal given above has two consequences concerning the doxastic state of the evaluating agent i relative to the prejacent p. First, note that given this semantics, it follows that the doxastic state of the evaluating agent cannot entail $\neg p$. An agent cannot have highest subjective credence in p while believing $\neg p$.

Next, we argue that $PF(S)$ gives rise to the mandatory implicature in (26):

(26) *p is not positively settled* (NPI)
A speaker i who asserts a declarative sentence of the form $PF(S)$ implicates that p is not positively settled in D_i.

The notion of p being positively settled relative to a set of worlds D is defined in (27):

(27) A proposition p is positively settled relative to a set of worlds D iff D entails p, i.e. $D \cap \neg p = \varnothing$.

The implicature in (26) arises because of the competition between asserting p and asserting $PF(p)$ in a context in which p is one of the answers to the QUD, as required by the semantics of the PF. The genesis of this implicature is as follows. First, we assume that a sentence S with semantic content p is simpler than $PF(S)$ with semantic content $PF(p)$. Next, note that when a speaker asserts p she publicly commits to p, which means that she presents herself as being in a doxastic state that entails p, i.e., $\forall w' \in \cap D_i$, $w' \in p$. Asserting a sentence whose semantic content is $PF(p)$ merely commits the speaker to being in a doxastic state that leads her to place highest

subjective credence in p. Thus, given the QUD presupposed by $PF(p)$, asserting p is always both relevant and more informative than asserting $PF(p)$. It follows that if a speaker asserts $PF(p)$ rather than p, she must have a reason for making a weaker and more complex statement, rather than a simpler and more informative one. This gives rise to the implicature that the speaker is not in a position to assert p, and therefore that $\exists w' \in \cap \mathrm{D}_i$ such that $w' \in \neg p$.

The NPI implicature fits the profile of what Lauer (2014) calls mandatory implicatures, i.e., implicatures that are not cancellable. Lauer is primarily concerned with disjunction, but the reasoning behind the implicature is similar to what we have argued above: asserting *A or B* implicates, by mandatory implicature, that the speaker is not in a position to assert either *A* or *B*, each of which would be simpler and more informative.[12]

Evidence that NPI is not cancellable is provided by (28):

(28) *Where is Maria?*

#Sarà a casa$_F$. In effetti, è a casa.
be:FUT.3SG at home in fact, be:PRS.3SG at home.
'I guess she is at home. In fact, she is at home.'

The infelicity of (28) is difficult to overcome. A parallel example involving disjunction is given in (29):

(29) *Where is Maria?*
She is at home or in the office. #In fact, she is at home.

From what was said above, the evaluating agent's doxastic state is not settled in favor of p (mandatory implicature), and it is not settled in favor of $\neg p$ (entailment). Putting these pieces together, the evaluating agent's doxastic state is not settled in favor of either p or $\neg p$.[13]

To illustrate the proposal briefly, consider (2), repeated in (30):

(30) *Where is Gianni?*

Gianni **sarà** a casa$_F$.
Gianni be:FUT.3SG at home
'Gianni is presumably home.'

In this case, the QUD is the denotation of *Where is Gianni now?* The constituent carrying the focus feature is the locative prepositional phrase *a casa*, 'at home', and the alternatives to be considered are of the form ⌜Gianni will be at x⌝, where x is a

[12] We are grateful to Ashwini Deo for pointing us toward treating (26) as a Lauer-style mandatory implicature. If one does not accept the existence of such implicatures, (26) would have to be treated as a presupposition.

[13] The notion of (un)settledness relevant here is the same as the subjective non-veridicality condition in Giannakidou and Mari (2017). While our account shares the notion of unsettledness with the proposal in Giannakidou and Mari (2017), it crucially differs from it in that it relies on subjective likelihood rather than universal quantification, and it distinguishes epistemic from doxastic bases. In the present account, the fact that p is not settled as far as the doxastic state of the evaluating agent is concerned is an implicature that the semantics of PF gives rise to. Note also that Farkas (2003) uses the notion of settledness, under a different name, in connection with mood distribution.

member of $[\![\textbf{at home}]\!]^f$. We have already argued that the set of contextually salient alternatives C is a subset of the QUD. Let us now suppose that $C = \{\{\text{w: Gianni is at home}\}, \{\text{w: Gianni is at the office}\}, \{\text{w: Gianni is on the bus}\}\}$. The issue the speaker's utterance is meant to address is which proposition in this set contains the evaluation world w.

According to our account, the PF sentence is defined just in case there is a unique alternative q in C such that q is subjectively more likely for the speaker than any other alternative in C relative to the speaker's doxastic state. If defined, the sentence is true if and only if the subjectively most likely alternative for the speaker is that Gianni is at home. Furthermore, the sentence implicates that p is not settled in the speaker's doxastic state.

Note now that NPI targets only the prejacent, and that—since C is required to be a non-singleton set—for the PF statement not to be vacuously true, at least one alternative to the prejacent must be compatible with D_i. However, our semantics does not require all alternatives in C to be compatible with D_i. This is as it should be because it is perfectly appropriate to follow a $PF(p)$ statement with denying one of the alternatives that is different from p.

(31) *Where is Maria? At the office, at home, or shopping?*
Sarà a casa$_F$. Non è in ufficio.
be:FUT.3SG at home not be:PRS.3SG in office.
'I guess she is at home. She is not at the office.'

Both Maria being at home and Maria being out shopping are assumed to be compatible with the speaker's doxastic state, and this suffices to satisfy NPI.

Before moving on to the empirical predictions of our proposal, we take a closer look at the role focus plays in our semantics. As pointed out above, following Rooth's theory of focus, we take focus—marked by F—to allow the construction of a set of alternatives to the prejacent (the argument of PF). Moreover, following Roberts (1996), we take focus to mark a connection with the QUD: for an assertion to be congruent to the QUD, the set of its focal alternatives must be a subset of the QUD. Therefore, focus on different constituents will generate different sets of alternatives and will be congruent with different QUDs. Consider (32).

(32) Aldo:Maria is very pale. What is wrong with her?
Bea: **Sarà** malata$_F$.
be:FUT.3SG sick
'She is presumably sick.'

The set of alternatives in (32) are all about Maria: for example, {Maria is sick, Maria is scared, Maria has not left her house in weeks}.

(33) Aldo:Maria seems preoccupied. What is bothering her?
Bea: [**Sarà** malata]$_F$.
be:FUT.3SG sick
'She is presumably sick.'

In (33), on the other hand, for Bea's assertion to be a congruent answer to the question, the focus must be broad, i.e. at the sentential level.[14]

3.2 Empirical predictions

Given NPI, the account predicts that PF will not be felicitous in case the speaker is assumed to be knowledgeable relative to the prejacent. This is confirmed by the infelicity of Bea's response in (34).[15]

(34) Aldo: You look nervous. What is bothering you?
Bea: #[**Sarò** malata]$_F$.
be:FUT.1SG sick
'I am presumably sick.'

Under normal assumptions, people, including Bea, know what it is that bothers them. Bea's answer in (34), however, claims that the subjectively most likely cause of her state is her being sick. Using the PF gives rise to the mandatory implicature that she is not in a position to simply assert the prejacent alone. In our account, Bea's answer above is predicted to be odd because, even though she has first-person authority over the content of her psychological state, she presents herself as merely guessing about it. In (35), on the other hand, Aldo's question targets the cause of Bea's physical state.

(35) Aldo: Why do you have a headache?
Bea: **[Avrò** contratto COVID-19]$_F$.
have:FUT.1SG contract:PP.M.SG COVID-19
'I probably caught COVID-19.'

Our account predicts the acceptability of Bea's answer here because people are not assumed to always be knowledgeable about the causes of their own physical states, and, when they are not, guessing can be appropriate.[16]

The ban against a counterfactual prejacent, illustrated in (20) above, follows from our account because $PF(p)$ entails that D_i is compatible with p and therefore $\neg p$ cannot be part of the common ground. The ban against a factual prejacent, exemplified in the MATH scenario, follows from NPI.

We have seen in the discussion above that $PF(p)$ statements come with the mandatory implicature that p is not settled in D_i. As we pointed out at the end of the last section, it follows from our account that some other alternative in C should be compatible with D_i. Consequently, a $PF(p)$ statement is predicted to be fine in a context

[14] We are not claiming that there always is a one-to-one mapping between prosodic focus and semantic focus: if the former underdetermines the latter, then we assume that the hearer will accommodate the focus structure and presupposition that allows the PF-sentence to be congruent to the QUD.

[15] Note that wide focus in Bea's utterance is required in order to make her answer congruent to Aldo's question. Narrow focus on any subcontituent in this utterance—for example, focus on the predicate *malata* only—would generate a set of alternatives of the form 'Bea is P' of which the question would not be a subset, thus violating the congruence requirement between questions and answers.

[16] We thank Ashwini Deo and an anonymous reviewer for leading us to think about these examples.

in which an alternative other than p is compatible with the speaker's doxastic state. The example in (36) shows that this prediction is correct.

(36) *Who invited Maria to the movies? Carlo, Ezio, or Franco?*

A: Potrebbe essere stato Carlo o Ezio; certo non Franco,
can:COND-PRS.3SG be:INF be:PP Carlo or Ezio certainly not Franco
perchè era malato.
because be:IMPF.3SG sick
'It might have been Carlo or Ezio; certainly not Franco, because he was sick.'

B: Capisco, o Carlo o Ezio. Quindi, **sarà** **stato**
understand:PRS-1SG, either Carlo or Ezio then be:FUT.3SG be:PP
Ezio_F, perchè Carlo la conosce appena.
Ezio because Carlo her knows barely
'I see, either Carlo or Ezio. In this case, it must have been Ezio, because Carlo barely knows her.'

B's statement is interpreted as claiming that Ezio is the most likely person to have invited Maria, while at the same time allowing for the possibility that in fact it was Carlo and not Ezio who did so.[17]

The account also predicts that a $PF(p)$ statement should be felicitous in case the speaker asserts that all alternatives in C are compatible with her doxastic state. The felicity of PF in (37) shows that this prediction is met.

(37) A: Who broke the vase?

B: Potrebbe essere stato chiunque, ma sapendo com'è
can:COND-PRS.3SG be:INF be:PP anyone but know:GER how is
imbranato, **sarà** **stato** Gianni_F.
clumsy, be:FUT.3SG be:PP Gianni

[17] In (i), we see that it is odd for a speaker to raise one possibility with the epistemic modal *potrebbe* and another using PF:

(i) *Who invited Maria to the movies? Carlo, Ezio, or Franco?*

#Potrebbe essere stato Carlo, ma **sarà** **stato** Ezio_F.
can:COND-PRS.3SG be:INF be:PP Carlo but be:FUT.3SG be:PP Ezio
'It might have been Carlo, but it will have been Ezio.'

We do not have an explanation for this fact except to suggest that it is a pragmatically odd move to draw attention to one possibility only to discard it immediately after and draw attention to another. Indeed, the sentence improves if the speaker has a reason to consider the Carlo alternative while believing that the Ezio alternative is the most likely:

(ii) *I wonder who invited Maria to the movies. Might it have been Carlo?*

Certo, potrebbe essere stato Carlo, ma secondo me **sarà**
sure, can:COND-PRS.3SG be:INF be:PP Carlo, but according to me be:FUT.3SG
stato Ezio_F.
be:PP Ezio
'Sure, it might have been Carlo, but according to me it will have been Ezio.'

'It might have been anyone but knowing how clumsy he is, it must have been Gianni.'

The infelicity of PF in the DOCTOR scenario is due, in our account, to the fact that $PF(p)$ statements require credence to be assigned to p relative to a doxastic modal base, a base that is not reflexive. In the DOCTOR scenario, however, the doctor is supposed to assess the alternatives in the QUD based on what she knows, modelled as a reflexive modal base. Epistemic modals such as *must* or *might* are appropriate in this scenario precisely because these modals quantify over epistemic modal bases. To exemplify, in the analysis defended by von Fintel and Gillies (2011), epistemic modals such as *must* and *might* are universal/existential quantifiers over those worlds where all the propositions that constitute a kernel of information K are true. In (38) we give exemplify this proposal for *must*.

(38) Strong *must* + Evidentiality.
Fix a c-relevant kernel K:

a. $[\![\textbf{must}\ \phi]\!]^{c,w}$ is defined only if K does not directly settle $[\![\phi]\!]^c$
b. $[\![\textbf{must}\ \phi]\!]^{c,w} = 1$ if $B_K \subseteq [\![\phi]\!]^c$
'where $B_K = \cap K$ and K whatever direct information is available to the speaker.'

K has two properties. First, information in K is direct or privileged information. Because one cannot have direct evidence about a proposition q unless q is true, $\cap K$ is reflexive. Second, the prejacent, p, is presupposed not to be settled relative to K. Now, the DOCTOR case illustrates a situation in which the speaker is expected to make an assessment based on knowledge. Note that a statement made relative to what the anchor knows (or a relevant subset thereof, as in von Fintel and Gillies's analysis) entails the corresponding statement made relative to what the anchor believes (or a relevant subset thereof). Therefore, a speaker that bases her assessment of the truth of a proposition p on what she believes, implicates that she is not in a position to assess the truth of p based on what she knows and, in particular, based on a body of relevant and direct information K available to her in the context. This is so because K is either empty or irrelevant to the prejacent and the QUD. In our account, the 'guessing' flavor of $PF(p)$ statements is due to (i) the fact that the modal base is restricted to being doxastic, and (ii) the competition with a stronger knowledge-based statement. The PF statement is odd in a doctor–patient exchange because the doctor's assessment is based merely on beliefs and implicates that the contextually relevant kernel of direct information available to the doctor cannot support the prejacent. In this situation and given the formal doctor–patient setting, one expects a doctor to refrain from making an assessment.[18]

The proposed account predicts that PF statements will be inappropriate in contexts in which the speaker is supposed to base her assessment of the truth of p on known facts rather than on her beliefs and assumptions. We therefore expect PF statements

[18] The judgments of our consultants varied in the DOCTOR scenario. Six out of ten speakers rated this sentence < 5 (again, on a 1–7 scale), two speakers gave the sentence a 5, and the remaining two speakers gave the sentence a 6. Given that in our account the oddness of this example is rooted in expectations about what a doctor would say to a patient, this variation is not entirely unexpected.

not to be appropriate as answers to questions asked in situations where the addressee is supposed to base her response on what she knows. This is the case not only in the DOCTOR scenario but also in the teacher-student scenario in (39):

(39) Teacher: What was the most important cause of the French Revolution?
Student: #**Sarà** **stata** [la povertà della popolazione urbana]$_F$.
be:FUT.3SG be:PP the poverty of-the population urban
'Presumably, it was the poverty of the urban population.'

Finally, the contrast between knowledge and beliefs is also responsible for the infelicity of PF in the MATH scenario, since mathematical conclusions are based on knowledge and not beliefs.[19]

On the flip side, our account predicts PF statements to be appropriate in situations in which the speaker is not required to base her assessments of possibilities purely on known facts. Such a scenario is illustrated in (40), a variant of the doctor example above.

(40) *Our doctor is having a private informal conversation with another doctor, who asks her what the matter is with Maria. She replies*:
Non mi raccapezzo.... **Sarà** narcolessia$_F$.
not me find.way be:FUT.3SG narcolepsy
'I can't figure it out... It could be narcolepsy$_F$.'

Addressing not a patient but a peer (and, therefore, without holding a position of authority over the addressee), the doctor is free to reveal that her knowledge is insufficient to draw any conclusion and to express her subjective opinion, which is not based on her medical knowledge.

Note that the implicature that the speaker is not in a position to make a knowledge-based inference can be explicitly suspended as in the following scenario.

(41) *Where is Maria?*
Sarà ancora in ufficio$_F$. Infatti, deve$_F$ essere ancora in
be:FUT.3SG still in office. indeed, must:PRS.3SG be:INF still in
ufficio perchè la luce in casa è spenta.
office because the light at home be:PRS.3SG off
'She is presumably still at the office. Indeed, she must still be at the office because the light at home is off.'

In (41), a PF statement is followed by a necessity epistemic statement suspending the implicature that the speaker is not in a position to support the prejacent with what she knows.[20]

The contrast between PF and epistemic modals exemplified in the IGNORANCE scenario above is also accounted for. Epistemic modal claims must be based on knowledge. Therefore, in cases where the speaker has emphatically asserted her ignorance about the topic, as in our IGNORANCE scenario, an epistemic *must*-claim will be infelicitous,

[19] In addition, we noted above that the MATH scenario also violates the NPI.

[20] Contrastive focus on the necessity modal *deve* is required in this situation.

while a PF statement is expected to be appropriate since such a statement is not based on what the speaker knows, and does not require any particular kind of evidence. The relevant example is repeated below.

(42) *Where is Maria?*

Non ne ho la più pallida idea. **Sarà** a casa$_F$.
not of.it have:PRS.1SG the most faint idea be:FUT.3SG at home
'I don't have the faintest idea. Presumably, she is at home.'

Here the speaker is interpreted as guessing her answer to the question since her assessment is based on beliefs, rather than knowledge (which she emphatically claims not to have).

We now turn to justifying the claim that the subjective likelihood involved in the interpretation of PF is comparative rather than absolute.[21] Under the hypothesis that the relevant notion is absolute likelihood, $PF(p)$ statements would require the prejacent to receive a credence level that surpasses a particular threshold, while under the comparative hypothesis what is required is for the prejacent to be the most likely alternative, a situation which is compatible with scenarios in which the credence level the speaker assigns to p is nevertheless rather low. The example in (42) supports the comparative likelihood hypothesis: PF is acceptable here even though the speaker claims to be ignorant about Maria's whereabouts. The sentence is interpreted as asserting that the prejacent is more likely than any other alternative in the QUD. By asserting (42), the speaker is not assumed to believe that the prejacent is subjectively more likely than some threshold of likelihood. What is required is that there be no alternative the speaker gives higher credence to.

To further illustrate this point consider the scenario in (43), where multiple alternatives are in play, and where one alternative is ranked higher than the others but still below a likelihood threshold of 0.5. As predicted by our account, PF is felicitous in such a situation.

(43) *Suppose it's 2022 and Lea doesn't know who won the UEFA cup in 2021. She believes that Bayern Munich was the most likely team to have won that year. Suppose we are talking about the chances of Bayern Munich (bm), Juventus (j), Barcelona (b), and Manchester City (mc) to have won the cup in 2021, and Lea's credence ranks these teams as follows: bm > j > b > mc. Lea tells her friend*:

Avrà vinto il Bayern$_F$.
have:FUT.3SG win:PP the Bayern
'I guess the Bayern won.'

However, the assertion in (43) does not commit A to the claim that it is likely that Bayern won, as shown by the following continuation.

[21] We thank Ashwini Deo and an anonymous reviewer for pushing us to clarify the fact that a comparative notion of subjective likelihood is needed rather than an absolute one.

(44) B: Quindi, secondo te, è probabile o no che
so, according to you, be:PRS.3SG probable or not that
abbia vinto il Bayern?
have:SUBJ-PRS.3SG win:PP the Bayern
'So, in your opinion, is it probable or not that Bayern won?'
A: Beh, questo non lo so.
well this not it know:PRS-1SG
'Well, that, I don't know.'

The account also predicts that PF will be appropriate in the BEST ALTERNATIVE scenario in (45): the speaker selects Gianni's being at home as the subjectively most likely answer given her doxastic state.

(45) *Where is Gianni?*
Dove vuoi che sia! **Sarà** a casa$_F$.
where want:PRS-2SG that be:SUBJ-PRS.3SG be:FUT.3SG at home
'Where could he be! He must be home.'

The fact that (45) is still interpreted as a guess is the result of an implicature arising from a competition with an epistemic modal sentence: the speaker chose not to evaluate the prejacent relative to a relevant kernel of direct (therefore, true) information, even though it would have been more informative than assessing the prejacent merely on the basis of what the speaker believes. As mentioned above, the implicature will be that the speaker was not in a position to do that because there is no relevant body of direct information that would support the prejacent. Note that the kernel of direct information that is part of the semantics of an epistemic modal is presupposed not to settle the prejacent, and thus it only allows the speaker to indirectly infer the prejacent. As result, the implicature will be that the kernel (that is, the body of direct evidence available to the speaker) does not even indirectly support the prejacent, i.e. it is either empty or it contains information irrelevant to the prejacent.

The contrast between *likely/probabile* and PF discussed in Sect. 2.2 can be explained along the same lines: unlike PF statements, we take likelihood predicates to evaluate the prejacent relative to a body of true propositions and, therefore, they are appropriate in contexts where knowledge-based assessments are requested, as in (46).

(46) *Maria is at the doctor, who has reviewed her test results. She asks her doctor what is wrong with her. The doctor replies*:
È probabile che sia narcolessia.
be:PRS.3SG probable that be:SUBJ-PRS.3SG narcolepsy
'It's probably narcolepsy.'

The fact that PF contrasts with possibility epistemic modals in not allowing multiple possibilities, illustrated in the MULTIPLE POSSIBILITIES scenario above, follows from the uniqueness presupposition in its semantics.

The examples we discussed till now involved mutually exclusive possibilities in C, and we only considered simple PF statements, disregarding the possibility of conjunctions and disjunctions. We turn now to these two cases, beginning with disjunction.[22]

First, staying with mutually exclusive possibilities, and taking an example inspired by a reviewer, let us assume that the QUD is *Where is Leo*, and that the context has narrowed down the possibilities to the four given in (47):

(47) a. m ={w: Leo is in Milan in w}
b. t ={w: Leo is in Turin in w}
c. g ={w: Leo is in Genoa in w}
d. b ={w: Leo is in Bologna in w}

Furthermore, assume that, given her subjective credence, the speaker ranks these possibilities as in (48):

(48) $m > t > g > b$

Under these circumstances, the speaker can truthfully assert any of the sentences in (49):

(49) a. Leo **sarà** a Milano$_F$.
Leo be:FUT.3SG at Milan
'Leo must be in Milan.'
b. Leo **sarà** a Milano$_F$ o a Torino$_F$.
Leo be:FUT.3SG at Milan or at Turin
'Leo must be in Milan or in Turin.'
c. Leo **sarà** a Milano$_F$ o a Torino$_F$ o a Genova$_F$.
Leo be:FUT.3SG at Milan or at Turin or at Genoa
'Leo must be in Milan or in Turin or in Genoa.'

Substituting other city names for the ones used in (49) would result in false statements. We give a sample in (50):

(50) a. Leo **sarà** a Torino$_F$.
Leo be:FUT.3SG at Turin
'Leo must be in Turin.'
b. Leo **sarà** a Torino$_F$ o a Genova$_F$.
Leo be:FUT.3SG at Turin or at Genoa
'Leo must be in Turin or in Genoa.'
c. Leo **sarà** a Torino$_F$ o a Genova$_F$ o a Bologna$_F$.
Leo be:FUT.3SG at Turin or at Genoa or at Bologna
'Leo must be in Turin or in Genoa or in Bologna.'

We show now that these facts follow from our account. In the case of (49-a), the prejacent proposition is m and the propositions in C are the focus semantic value of the prejacent sentence, namely $\{m, t, g, b\}$. Among these propositions, the speaker

[22] We are grateful to our reviewers for encouraging us to consider these cases in detail.

assigns highest credence to m, and therefore (49-a) is true and felicitous, while substituting any other city name from our set to *Milano* results in a false sentence.

As for (49-b), first note that while this sentence is intuitively true in the given context, it carries the implicature that the speaker prefers not to distinguish between the credence level she assigns to m and the credence level she assigns to t. Thus, (49-b) is interpreted as communicating that the speaker assigns higher credence to m and to t than to either g or b, and that she wishes to avoid ranking m and t relative to one another.

Turning now to our account, we assume an LF in which PF takes scope over the disjunction, as in (51).[23]

(51) PF[[Leo be in Milan$_F$]] or [[Leo be in Turin$_F$]]

The prejacent proposition is the ordinary semantic value of the prejacent sentence, namely $m \vee t$. The propositions in C are the set of propositions in the focus semantic value of the prejacent sentence, given in (52):

(52) $\{m \vee t, m \vee g, m \vee b, t \vee g, t \vee b, g \vee b\}$

Among these, the speaker assigns the highest credence to $m \vee t$, and therefore (49-b) is true in our original context. If the QUD is assumed to contain not only the most informative propositions, namely m, t, g, and b, but also the less informative ones obtained by the binary disjunctions over this set, no problem arises. The implicature that the speaker is not willing to commit to ordering m relative to t arises given that, by uttering a disjunction, she chooses to order only the less informative disjunctive propositions in a situation in which ordering the more informative propositions is relevant. Thus, the speaker implicates that her credence in m is not significantly different from her credence in t and therefore she avoids committing to either m or t.

Under the assumption that the QUD contains only *m, t, g, b* the condition that C be a subset of QUD is violated in (49-b). Under our account, the speaker is not addressing the current QUD but rather, an accommodated, less informative QUD, one that includes the binary disjunctive propositions as well.

Under both assumptions, we capture the fact that (49-b) is true in our original context, as well as the implicature that the speaker is not comfortable distinguishing between the credence level she assigns to m and the one she assigns to t. Were she willing to distinguish between the credence level she assigns to these two possibilities, asserting the one she has highest credence level in would be both simpler and more informative. Note that in the given context, replacing (49-b) with any other binary disjunction results in a false sentence.

The account of (49-c) is analogous. In this case, the LF of the sentence is as in (53).

(53) PF[[Leo be in Milan$_F$]] or [[Leo be in Turin$_F$] or [Leo be in Genoa$_F$]]

The propositions in C are those in (54):

[23] For reasons of space we do not discuss the alternative in which the disjunction scopes over PF.

(54) $\{m \vee t \vee g, m \vee t \vee b, m \vee g \vee b, t \vee g \vee b\}$

Of these, $m \vee t \vee g$ is highest ranked relative to the speaker's credence level, which explains why (49-c) is true in our original context. And just as in the case of (49-b), the speaker implicates that she is not in a position to distinguish between the credence levels she assigns to each disjunct. Her statement entails, however, that all three are ranked above b. By uttering a three-way disjunction the speaker implicates that she is not ready to commit to assigning highest credence level to m, t, or g or any binary disjunction over these propositions since if she could do so she could assert a sentence that would be both simpler and more informative. Our account also explains why, unlike the three sentences in (49), the following PF-disjunction is odd in the scenario in which the alternatives being considered are m, t, g, and b.

(55) Leo **sarà** a Milano$_F$ o a Torino$_F$ o a Genova$_F$ o a Bologna$_F$.
Leo be:FUT.3SG at Milan or at Turin or at Genoa or at Bologna
'Leo must be in Milan, or in Torino, or in Genoa or in Bologna.'

Since the prejacent is $[m \vee t \vee g \vee b]$, and since this disjunction exhausts all possibilities, there is no other alternative in C and therefore the focus requirement that C be a non-singleton set is not met.

Let us turn now to cases where the alternatives in C are not mutually exclusive by considering a scenario in which the QUD is *What did Leo eat?*, and the possibilities in the context are that he ate at least the apple, at least the pear or both. The possible PF statements in this case are given in (56).

(56) a. **Avrà** **mangiato** la mela$_F$.
have:FUT.3SG eat:PP the apple
'He must have eaten the apple.'
b. **Avrà** **mangiato** la pera$_F$.
have:FUT.3SG eat:PP the pear
'He must have eaten the pear.'
c. **Avrà** **mangiato** [la mera e la pera]$_F$.
have:FUT.3SG eat:PP the apple and the pear
'He must have eaten the apple and the pear.'

Let us denote by a, p and $a + p$ the propositions denoted by *Leo ate the apple*, *Leo ate the pear* and *Leo ate the apple and the pear* respectively, where *the apple and the pear* is interpreted as denoting the sum of the apple and the pear. These then are the propositions in C for all three examples in (56). By uttering (56-a) the speaker claims that she places highest credence in a, by uttering (56-b) she claims that she places highest credence in p, and by uttering (56-c) she claims that she places highest credence in $a + p$. Uttering either (56-a) or (56-b) is compatible with the speaker being committed to the possibility $a + p$ being the case, though her credence in this possibility is lower. This prediction is confirmed by the felicity of (57).

(57) Non so se ha mangiato la pera, ma **avrà**
not know:**prs-1sg** if have:PRS.3SG eat:PP the apple but have:FUT.3SG
certo **mangiato** la mela$_F$.
certainly eat:PP the apple
'I don't know whether he has eaten the pear, but he must have eaten the apple.'

Our account also predicts, correctly, that the conjunction in (58) is infelicitous:

(58) #**Avrà** **mangiato** la mela$_F$ e **avrà** **mangiato** la pera$_F$.
have:FUT.3SG eat:PP the apple and have:FUT.3SG eat:PP the pear
'He must have eaten the apple and he must have eaten the pear.'

This sentence is infelicitous because it violates the uniqueness presupposition of PF: the claim it makes is that a has the highest credence level, and that p has the highest credence level.

Before concluding this section, we briefly summarize the main features of PF in our account.

1. $PF(p)$ involves an assessment rooted in a doxastic base, rather than in an epistemic or normality base.
2. The prejacent p has to be a member of the QUD in the context of assessment.
3. The prejacent p can neither be factual nor counterfactual relative to the context, i.e., the context cannot have established either that p is true or that it isn't.
4. PF is felicitous in cases in which the evaluating agent has low credence in the prejacent as well as in cases in which she has high credence in it, as long as the evaluating agent assigns to it a higher subjective credence than to all other alternatives in the C, a contextually salient subset of the QUD.

In the next subsection we defend treating the contribution of PF as part of the compositional semantics of the sentence in which it occurs, and briefly discuss connections with evidentiality.

3.3 The status of the contribution of PF

The main issue we address in this subsection is whether the contribution of PF is part of the semantic content of the sentence in which it occurs, as in the account developed above, or not. We take non-semantic content to include expressive content as well as content that signals contribution to the conventional discourse effect of a sentence. Evidence in favor of treating the contribution of PF as part of the semantic content comes from three sources, polarity particle interpretation, embedding, and comparatives.

With respect to polarity particles, we assume, following Roelofsen and Farkas (2015) among others, that they are anaphoric to a discoursally prominent proposition provided by the previous utterance. In the case of a polar interrogative, this proposition is contributed by the semantic content of the sentence radical. If PF contributes to the semantic content of the proposition in which it occurs, we expect the whole proposition,

$PF(p)$, to be able to serve as an antecedent to a polarity particle. We see in (59) that this expectation is fulfilled: *sì*, 'yes', in B's response takes $PF(p)$ as its antecedent.

(59) *Where is Gianni?*
A: **Sarà** a casa$_F$?
be:FUT.3SG at home
'Could he be home?'
B: Sì, sì, **sarà** a casa$_F$. Proviamo a chiamarlo.
yes yes be:FUT.3SG at home. try:IMP-1PL to call-him
'Yes, he is presumably home. Let's try to call him.'

The answer in (59) makes clear that B does not know where Gianni is and cannot rule out the possibility that Gianni is somewhere other than home. Therefore, in answering 'yes' to A's question, B is not assenting to the prejacent (that Gianni is at home) but to the weaker, modalized, proposition (that the subjectively most likely alternative is that Gianni is at home). The possibility of $PF(p)$ to serve as antecedent to a polarity particle response, as in (59), supports an account that treats PF as contributing to the semantic content of the sentence in which it occurs.

There are also cases in which the antecedent of a polarity particle is a subpart of the semantic content of the utterance the particle reacts to, as exemplified in (60):

(60) Anna: Where is Bob?
Carol: His mother thinks he's home.
Anna: No, he isn't home. His parking spot is empty.

Since the embedded clause in the sentence uttered by Carol is directly relevant to the QUD (i.e. where is Bob?), it can serve as antecedent to the polarity particle in Anna's response. This situation can arise with PF as well, as illustrated in (61).

(61) A: *Where is Gianni?*
B: **Sarà** a casa$_F$.
be:FUT.3SG at home
'He is presumably at home'.
C: No, non è a casa.
no not be:PRS.3SG at home.
'No, he is not at home'.

The QUD at the beginning of the discourse in (61) is 'where is Gianni?' Let us assume that the propositions in this QUD are {Gianni is at home, Gianni is at the office, Gianni is on the bus}. B's answer is a PF statement which is pertinent to the unmodalized QUD but does not directly answer it. In C's reply, the antecedent of the negative polarity particle 'no' is the prejacent in B's utterance. C's statement reveals that he is in a different doxastic state than B and, because of this, he is in a position to rule out one of the alternatives in the QUD. C could have also disagreed with B's whole modalized proposition, as shown in (62), in which case C would also be indirectly addressing the QUD. In (62), by uttering the negative polar particle *no*, C does not have to reject the possibility that Gianni is at home but merely rejects B's assertion that the most likely alternative is that Gianni is at home.

(62) *Neither A nor B not C know where Gianni is. There are three possibilities: home, office, and gym.*
A: *Where can Gianni be?*
B: **Sarà** a casa$_F$.
be:FUT.3SG at home
'He is presumably at home.'
C: No, **sarà** in ufficio$_F$.
no be:FUT.3SG in office
'No, presumably he is in his office.'

We take the possibility of reacting to both the prejacent (as in (61)) and the whole PF claim (as in (59) and (62)) to show that, in a context where the QUD is about the prejacent (*whether p*), asserting $PF(p)$ indicates that the speaker's knowledge does not support an answer to the QUD.

Note that the same facts are true of epistemic modals as well: the polarity particle can either be anaphoric to the prejacent only (as shown in (63)) or to the whole modalized proposition (as shown in (64)).

(63) A: *Where is Gianni?*
B: Può essere a casa.
can:PRS.3SG be:INF at home
'He might be at home.'
C: No, non è a casa.
no not be:PRS.3SG at home
'No, he is not at home.'

(64) A: *Where is Gianni?*
B: Deve essere a casa.
must:PRS.3SG be:INF at home
'He might be at home.'
C: No, potrebbe essere in palestra.
no can:COND-PRS.3SG be:INF in gym
'No, he might be at the gym.'

Turning to the embedding potential of PF sentences, the picture that emerges is less clear mostly because constraints on embedding possibilities have a variety of sources, and therefore one cannot use embedding as an absolute test for diagnosing semantic content. Restrictions on the embedding potential of epistemic necessity and possibility modals have been noted by Hacquard and Wellwood (2012), Anand and Hacquard (2013), Ippolito (2017), among others. At least some of the proposals that have been advanced to explain such embedding restrictions have maintained the assumption that epistemic modals contribute to the truth-conditions of the sentences in which they occur.

First, as exemplified in (65), PF sentences can occur as complements of propositional attitude predicates, a fact that is at least consistent with the assump-

tion that PF contributes to the semantic content of the sentence in which it occurs.[24]

(65) a. Immagino che Carlo **sarà** già arrivato.
imagine:PRS-1SG that Carlo be:FUT.3SG already arrive:PP
'I imagine that Carlo would have already arrived.'

b. Chi lo conosce è certo che Carlo **avrà** **fatto** carte
who him know:PRS-2SG is certain that Carlo be:FUT.3SG make:PP cards
false per rivedere suo figlio.
false to see:INF.again his son
'Those who know him are certain that Carlo would have done all he could to see his son again.'

As discussed above, PF presupposes that the prejacent is a member of C, which in turn is a subset of the QUD. Therefore, even when $PF(p)$ is embedded, p must be directly relevant to the current QUD. This aspect of the semantics of PF sentences can explain why embedded PF clauses are most natural under doxastic or epistemic predicates, preferably in the first person and in the present tense. However, as long as the prejacent is relevant to the resolution of the QUD and the matrix predicate is of the right type, embedded PF clauses are fine with third person subjects as well, as in the previous example or in (66).[25]

(66) *People in a small town are talking about the whereabouts of Joe, one of the town's people who is now a fugitive.*

A: Joe **avrà** già **passato** il confine.
Joe be:FUT.3SG already cross:PP the border
'Joe has presumably already crossed the border.'

B: Hai ragione.' Anche la polizia pensa che a questo punto
have:PRS.2SG right also the police believe that at this point
avrà già **passato** il confine.
be:FUT.3SG already cross:PP the border
'You're right. The police too believe that at this point he must have already crossed the border.'

We want to stress, however, that embedding of PF sentence is not unconstrained. We already noticed that embedding under some attitude verbs (e.g. *credere*, 'to believe') affected acceptability. The example in (67) shows that a PF sentence also resists being embedded in the antecedent of a conditional.

(67) *Se **sarà** **partito** stamattina$_F$, è già arrivato a casa.
if be:FUT.3SG leave:PP this morning be:PRS.3SG already arrive-PP at home
'If he presumably left this morning, he already arrived.'

[24] Embedding PF under *essere certo*, 'be certain', and *essere convinto*, 'be convinced', was judged considerably more acceptable by our consultants than embedding PF under *credere*, 'believe', and *pensare*, 'think', and among the last two, *credere* was judged worse than *pensare*. A detailed study of these differences and their significance lies outside the scope of this paper.

[25] All of our ten linguistic consultants gave the B sentence in (66) a score ≥ 5 (and six of them gave the sentence a score ≥ 6).

We are not going to explore these constraints further in this paper since they would take us too far afield and would be beyond the scope of this paper, but see Mihoc et al. (2019) for relevant discussion.[26] The data we collected show that there is considerable variation across speakers with respect to which embeddings are acceptable and which are not. Most of our consultants found at least some kind of embedding or anchoring to an individual other than the speaker possible, but preferences varied across speakers.

One last piece of evidence in favor of a semantic account comes from the possibility of having PF in comparative sentences. The example in (68) illustrates this.

(68) Gianni **sarà** in ufficio$_F$, più che a casa.
Gianni be:FUT.3SG in office more than at home
'Gianni is more likely to be in his office than at home.'

This example is interpreted as claiming that the likelihood that Gianni is in his office is higher than the likelihood that he is at home. Thus, the comparative clause *più che a casa*, 'more than at home', appears to realize explicitly the comparison term for the likelihood relation that was implicit in the semantics we gave in Sect. 3. Because 'being in the office' and 'being at home' are not gradable predicates in the relevant sense, we can rule out the possibility that the comparative is part of the prejacent since that would give rise to the proposition that Gianni is in his office to a degree that is greater than the degree to which he is at home.[27] Our proposal can account for (68) straightforwardly: the two alternatives that are being ranked are the proposition that Gianni is in the office, which we denote by o and the proposition that Gianni is at home, which we denote by h. C in this case is $\{o, h\}$. When uttering (68), the speaker asserts that the subjectively most likely alternative is o, not h. Formally, the truth conditions of (68) are as in (69).

(69) $[\![$Gianni **sarà** in ufficio$_F$, più che a casa$]\!]^{g,w,t,c}$ is defined iff there is a $q \in C$ s.t. $\forall : r \in \{\text{o, h}\}$ and $r \neq q$ $q >_{i,t,D_i,w} r$. If defined, o = the $q \in C$ s.t. $\forall : r \in \{\text{o, h}\}$ and $r \neq q$ $q >_{i,t,D_i,w} r$

Though a detailed analysis of these comparative structures is beyond the scope of this paper, we take the possibility of this construction to be further evidence that the comparative relation expressed by PF is part of the semantic content of a PF sentence, and that the second argument of this relation can be expressed overtly in the sentence.

So far in this subsection we have addressed the question of whether the contribution of PF is part of the semantic content of the sentence or not. In the literature, this question is often linked to the issue of whether PF is a marker of indirect evidentiality. It is to this question that we now turn. In the account proposed by Frana and Menéndez-Benito (2019), PF in Italian signals that the prejacent is a conjecture based at most on indirect evidence. In support of this proposal, they argue that PF sentences share the

[26] For discussion of the restrictions on the embedding of non-root modals more generally (e.g. epistemic modals), see for example Papafragou (2006).

[27] This proposition is only meaningful with the "frequency" reading: Gianni is more often in his office than at home. The frequency reading is not the intended reading for (68). A second reason to doubt that the comparative phrase *più che a casa* is part of the prejacent is that there is a clear intonational break and a pitch change (from high to low) between it and the preceding sentence *Gianni sarà in ufficio*, 'Gianni is presumably in the office', hence the comma in (68).

following three characteristic properties with evidentials: (i) the evidence supporting the prejacent is at most indirect, and therefore PF sentences are compatible with complete lack of evidence; (ii) PF is always anchored to the speaker in declaratives; (iii) the evidential component is not at-issue and therefore it is unchallengeable.[28] In the remaining part of this section, we offer some arguments that challenge the conclusion that PF must be treated as an evidential marker.

Frana and Menéndez-Benito discuss the example in (70) in support of the first property:

(70) *Elena's husband is a soldier away at war. His whereabouts are completely unknown at the moment. Carmela is trying to comfort Elena:*

Non ti preoccupare, **sarà** [sano e salvo]$_F$.
not you worry:INF be:FUT.3SG healthy and safe
'Don't worry, I'm sure he's safe and sound.'

The claim is that in (70), PF is appropriate even though Carmela has no evidence whatsoever with respect to Elena's husband's situation because what PF requires is at most indirect evidence, which is consistent with having no evidence at all. We agree that the function of the PF statement in this example is to reassure and comfort Elena, and we also agree with the observation that the speaker in (70) does not need to have any factual evidence about the soldier's situation. These properties of (70), however, are accounted for under the present analysis as well. Carmela asserts that the prejacent is the subjectively most likely alternative but the PF statement is silent as to what kind of evidence (if any) the speaker might have. However, as discussed above, the statement will implicate that her assessment is not supported by what she knows. Normally, since she has offered her PF statement in response to the (implicit) question about the soldier's situation, she will be understood as having a doxastic state that supports, however tenuously and vaguely, her credence in the prejacent.

Our account departs from Frana and Menéndez-Benito's in that it predicts that $PF(p)$ is not acceptable in a situation that enforces the speaker's ignorance relative to p and where the issue of subjective likelihood does not arise. To show that this prediction is correct, consider the coin-tossing example in (71).

(71) *A random coin-tossing machine has just tossed a coin for the first time. Bill hasn't seen the outcome and is now asked to say what came up. Bill says:*

#Sarà **venuto** testa$_F$.
be:FUT.3SG come:PP heads
'It presumably came up heads.'

In this scenario, since Bill knows that the machine is random and that this is the machine's first coin-tossing, the presupposition that there is a subjectively most likely alternative based on what he believes is not satisfied. This explains the oddity of (71). Frana and Menéndez-Benito (2019) predict PF to be fine in (71) because in their proposal the speaker does not need to have any evidence in support of the prejacent.

[28] For more on diagnosing evidentiality, see Murray (2010) and references therein.

The second property Frana and Menénedez-Benito ascribe to PF sentences, namely that they are necessarily anchored to the speaker in declaratives, does not always hold. We already saw in example (66) above that the anchor of the embedded PF can be someone other than the speaker, i.e. the police, while in (65) it is the people who know Carlo, though there appears to be variability across speakers' judgements in cases in which the anchor is not the speaker.

In support of the claim that PF sentences must be anchored to the speaker, Frana and Menéndez-Benito give the example in (72) (modeled after an example in Kratzer (2009)):

(72) FILING-CABINET
None of us has had access to the information in this filing cabinet, but we know that it contains the complete evidence (including possibly forged evidence) about the murder of Philip Boyes and narrows down the set of suspects. We are betting on who might have killed Boyes according to the information in the filing cabinet.

S: According to the information in the filing cabinet, I might have killed him.
S′:#Secondo l'informazione contenuta in questo archivio, l'**avrò**
according.to the information contain:PP in this cabinet him be:FUT.3SG
ucciso io$_F$.
kill:PP I
'According to the information contained in this cabinet, I will have killed him.'

As pointed out by Ippolito and Farkas (2019), the problem with the PF sentence in (72) is due to the fact that the anchor in (72) is non intentional, and therefore not able to assign subjective likelihood to a proposition. This explains why PF is acceptable in (66) but not in (72). We therefore conclude that PF is not obligatorily speaker-oriented.

Turning to non-challengeability, note first that, as argued by Korotkova (2019), non-challengeability is not unique to evidentials, but rather, it characterizes expressions that involve a certain type of subjective content. In cases like (73), (74) and (75), the speaker is the ultimate authority with respect to her inner states and therefore her reports on those cannot normally be legitimately challenged:[29]

(73) A: I have a splitting headache.
B: #No, you are wrong.

(74) A: I dreamt that I was in Paris.
B: #No, you didn't.

(75) A: I think that there is life on Mars.
B: You are mistaken, there is no life on Mars/#you don't think that.

The oddity here is due to the fact that B is in the best position to decide what B considers subjectively most likely, and therefore challenging her claim is infelicitous.

Recall that in our account, the semantics of PF involves a subjective component: the anchor assesses p as being subjectively the most likely alternative based on her doxastic base. This subjectivity, we claim, is the reason why some denials of PF

[29] The challenge may only be appropriate if the addressee thinks that the speaker is either lying or is incapable of assessing her own feelings and thoughts (for example, in a situation where the speaker's judgment is impaired). This is what Korotkova (2019) (based on Anand (2009)) calls *performance disagreement*.

sentences are odd. Thus, the reaction in (76) is odd if interpreted as challenging the $PF(p)$ statement without shifting the anchor, and thus asserting that it is not true that B assigns the prejacent the highest likelihood according to his doxastic state.[30]

(76) A: *Where is Gianni now?*
B: **Sarà** a casa$_F$.
be:FUT.3SG at home
'He is presumably home.'
C: #Non è vero.
not be:PRS.3SG true
'It's not true.'

Note, however, that not all denials of PF claims are infelicitous: in particular, denying a PF claim by saying *ti sbagli*, 'you are mistaken', is acceptable, as shown in (77).

(77) A: *Where is Gianni now?*
B: **Sarà** a casa$_F$.
be:FUT.3SG at home
'He is presumably home.'
C: No, ti sbagli. **Sarà** piuttosto ancora in ufficio$_F$.
no you be:PRS-2SG.mistaken be:FUT.3SG rather still in office
'You're mistaken. He's more likely to still be at the office.'

In our account, cases like (77) are instances of what has come to be known as faultless disagreement.[31]

PF sentences express an attitude towards the prejacent that other people may or may not share. This means that an interlocutor may agree with a PF statement if she too considers the prejacent to be the most likely alternative given what she believes, or may disagree with such a statement if she does not share this assessment. (For a discussion of the difference between assessing a claim as true or false, and agreeing with a claim, see Roberts (2017).) In (77), C does not share B's state of mind relative to Gianni's whereabouts, and expresses her own assessment. In B's utterance, B is the anchor of the response, which means that she reports her own subjective likelihood assessment, while in C's utterance, the anchor of the response is C. A case of agreement is exemplified in (78):

(78) A: Gianni **sarà** a casa$_F$.
Gianni be:FUT.3SG at home
'Gianni will be home.'
B: Sono d'accordo. A quest'ora **sarà** a casa$_F$.
be:PRS.1SG. of agreement at this time be:FUT.3SG at home
'I agree. At this time Gianni will be at home.'

[30] We saw with C's utterance in (61) that one can challenge the prejacent itself: this is acceptable because what is challenged in this case is not the subjective assessment but only the truth of the prejacent.

[31] For discussion of 'faultless disagreement' see Kölbel (2003), Lasersohn (2005), Stephenson (2007), von Fintel and Gillies (2011), Korotkova (2016), among many others.

In this case too, the anchor of the agreeing response is the person who utters it, in this case B, rather than her interlocutor. We take the facts in (77) and (78) to show that a PF claim can be challenged as long as this is done in ways that allow the anchor to shift from one speaker to the other.

In sum, the addressee can challenge the speaker's PF claim based on two reasons: (i) because she knows more about the QUD, in which case she will deny the prejacent as in (61); or (ii) because she does not know more about the QUD but her subjective assessment is different, in which case she will deny the whole PF statement as in (77). In the latter case, the anchor shifts from the original speaker to the challenger.

3.4 Interaction with negation

It is a robust generalization that PF cannot take scope below negation.

(79) Non avrà passato il test. (PF > neg, *neg > PF)
not be:FUT.3SG pass:PP the test
'He must not have passed the test.'
NOT: It is not the case that he must have passed the test.

The lack of scope flexibility with respect to negation can shed doubt on the conclusion of the preceding discussion, i.e. that PF is part of the asserted content of a PF sentence. In this subsection, however, we argue that the apparent impossibility of negation to take scope over PF is the result of the existence presupposition triggered by PF.

According to our account, PF presupposes that there exists a unique alternative that is the subjectively most likely alternative in C. Because of this presupposition, $\neg PF(p)$ is equivalent to $PF(\neg p)$. To see why, consider first the case in which the set of alternatives is $\{p, \neg p\}$ and assume one asserts that it is not the case that p is the subjectively most likely alternative. The presupposition that there is a subjectively most likely alternative entails that this most likely alternative is $\neg p$. For cases where C contains more alternatives, the same result is reached, whether or not these alternatives are mutually exclusive. For example, suppose that the issue is Gianni's whereabouts, and suppose that there are three possible mutually exclusive alternatives {*Gianni is at home*, *Gianni is at the office*, *Gianni is at the gym*} (or, in short, {*home*, *office*, *gym*}).

(80) *Where is Gianni?*
Sono le 6. Non **sarà** più in ufficio$_F$.
be:PRS.3PL the 6 not be:FUT.3SG anymore in office
'It's 6 o'clock. He must no longer be at the office.'

In (80), the speaker asserts that it is not the case that *office* is the most likely alternative. Given the presupposition contributed by PF (that there is a most likely alternative in C), it follows from $\neg PF(office)$ that one of the other alternatives is the most likely one. Since the alternatives are mutually exclusive, it follows that the most likely alternative is a non-office alternative, i.e. that it is subjectively most likely that Gianni is not at the office. Given our semantics, $\neg PF(office)$ and $PF(\neg office)$ are equivalent, and this equivalence is responsible for the illusion of fixed scope relative to negation.

This analysis works for non-mutually exclusive alternatives too. Suppose that C is {Leo ate the apple, Leo ate the pear, Leo ate the apple and the pear} (or, in short, {*apple, pear, apple+pear*}). The sentence in (81) has the logical form $\neg PF(apple)$ and it expresses the proposition that it is not the case that *apple* is the most subjectively likely alternative for the speaker.

(81) A: What did Leo eat?
B: Non **avrà** (certo) **mangiato** la mela$_F$.
non be:FUT.3SG (certainly) eat:PP the apple
'Surely he didn't eat the apple.'

This means that the most subjectively likely proposition is either *pear* or *apple+pear*. However, assuming that for any propositions p and q with subjective probabilities $P_S(p)$ and $P_S(q)$, $P_S(p \wedge q) \leq P_S(p)$, it follows that *apple+pear* cannot have a higher credence than *apple*. Therefore, given the existence presupposition triggered by PF, the proposition that it is not the case that it is subjectively most likely that Leo ate the apple is strengthened to the proposition that it is subjectively most likely that Leo didn't eat the apple.

This concludes our discussion of PF in declaratives. We turn to interrogatives in the next section.

4 PF in interrogatives

We assume a Hamblin-style semantics for interrogatives according to which the denotation of an interrogative is the set of propositions that constitute its least informative complete possible answers. We exemplify schematically with the denotation of a polar interrogative PF sentence in (82).

(82) $[\![PF(S_F)?]\!] = \{[\![PF(p)]\!], W \setminus [\![PF(p)]\!]\}$

Each proposition in the denotation of the interrogative has the PF semantics given in (25). Due to the subjective nature of PF, interrogatives are subject to what Murray (2010) calls 'interrogative flip', which requires the contextually bound value for the anchor i in questions to be the addressee rather than the speaker. The positive answer to the interrogative commits its speaker to the proposition $PF(p)$, whereas the negative answer commits her to $\neg PF(p)$. This is illustrated in (83).

(83) A: **Sarà** già **arrivato** Gianni?
be:FUT.3SG already arrive:PP Gianni
'Will Gianni have arrived already?'
B: Sì, **sarà** già **arrivato**.
yes be:FUT.3SG already arrive:PP
'Yes, he is presumably already arrived.'
B: No, non **sarà** ancora **arrivato**.
no not be:FUT.3SG yet arrive:PP
'No, he is presumably not arrived yet.'

Note that the negative answer in (83) is understood obligatorily with narrow scope negation for the reasons explained in Sect. 3.4.

The account predicts that in a PF interrogative, the prejacent is required to be unsettled in D_i, where i is the addressee. In other words, the addressee is assumed to be agnostic about the answer to the QUD. To see that this prediction is correct, compare the LACK OF COMPETENCE case in (84) with the QUIZ case in (85).[32]

(84) LACK OF COMPETENCE
Two Egyptologists have just discovered a sarcophagus. It contains a mummy. One egyptologist says to the other:

Sarà un uomo$_F$ or una donna$_F$?
be:FUT.3SG a man or a woman
'Would this be a man or a woman?'

(85) QUIZ
Quiz show host to contestant:

#In che anno **sarà** **stato** **firmato** il trattato di Versailles?
in what year be:FUT.3SG be:PP sign:PP the treaty of Versailles
'In what year would the treaty of Versailles have been signed?'

PF is acceptable in (84) because the addressee is not assumed to know whether the mummy is a man or a woman. In (85), on the other hand, PF is inappropriate because in quiz contexts the addressee cannot be assumed not to know the answer to the question. Note, however, that in the more complex situation described in (86), where the contestant has already proven his ignorance about the question, the host's PF interrogative becomes acceptable.

(86) *Host to contestant*:
A: in che anno è stato firmato il trattato di Versailles?
in what year be:PRS.3SG be:PP sign:PP the treaty of Versailles
'In what year was the treaty of Versailles signed?'
B: (Contestant remains silent)
A: Insomma, su, cerchi di ragionare. Sappiamo che seguì
well come on try to reason know:PRS- 1PL that follow:PST.3SG
la Prima Guerra Mondiale. Quindi, in che anno **sarà** **stato**
the first war world thus in what year be:FUT.3SG be:PP
firmato il trattato di Versailles?
sign:PP the treaty of Versailles
'Come on, try to think. We know that it followed World War I. So, in what year would the treaty of Versailles have been signed?'

By remaining silent when asked the question for the first time, B reveals that he is ignorant about the answer to the question. A's subsequent PF question is felicitous

[32] If one assume that, in the context of the example, being a man or a woman exhaust the possibilities, a question like (84) will be interpreted with disjunction taking scope over PF so that the question can be felicitously paraphrased as *sarà un uomo o sarà una donna?*, 'will this be a man or will this be a woman?' Under this binary assumption, interpreting disjunction in the scope of PF would give rise to infelicity since there is only one possible disjunctive proposition that can be construed out of two possibilities.

because it is inviting B to search for the answer that is subjectively most likely given what B believes.[33]

Finally, (87) shows that in contexts in which the addressee is presupposed to know whether the prejacent is true, PF is infelicitous:

(87) *Maria is talking on the phone with her sister Anna who she hasn't spoken to in years.*

#Avrai ancora [quelle emicranie che ti venivano da
be:FUT.2SG still those migraines that to.you come:IMPF.3PL as
giovane]$_F$?
young
'Do you still have those migraines you used to have when you were young, I wonder.'

The question in (87) becomes felicitous in situations where the addressee is absent (as in a written communication). In this case, the question can be interpreted as self-addressed, and PF is felicitous.

Before concluding this section, we note that questions asked using a PF interrogative have been labeled *conjectural questions*, i.e., questions that signal that the speaker does not assume that the addressee will settle the issue raised by the question (Frana and Menéndez-Benito 2019; Eckardt and Beltrama 2019; Littell et al. 2009). In our account, the conjectural nature of PF questions follows from their semantics. Each alternative in the denotation of a PF interrogative is a proposition in C embedded under the scope of PF (i.e. $\{PF(p), PF(q), ...\}$). These are the responses such a question projects, in the sense of Farkas and Bruce (2010). Because of the interrogative flip, the anchor of the propositions in the denotation of the interrogative is the addressee. As a consequence, the questioner assumes that at least some alternative other than the prejacent is compatible with the addressee's doxastic state, and therefore she assumes that the addressee is not in a position to settle the QUD. The addressee is projected to respond by asserting which alternative she finds subjectively most likely. Note also that under default assumptions about asking a question, the participant who utters a PF interrogative is not assumed to know the answer to the QUD either, and therefore PF interrogatives are predicted to be felicitous in situations in which neither the speaker nor the addressee know the answer to the QUD. As a consequence, we expect PF interrogatives to be infelicitous when used as rhetorical questions whose answers are supposed to be obvious in the context. As shown in (88), this expectation is met.[34]

[33] Even though the contestant is asked to think about a war and a treaty, the answer can still be considered an 'educated guess' in that the contestant is going to make an inference based on general facts about wars and treaties, while lacking any specific information about this particular historical event.

[34] As far as we are aware, this fact has not been noted in the previous literature. Fălăuş and Laca (2014) mention that PF is acceptable in rhetorical questions in Spanish and Romanian. This may be a genuine difference between Italian on the one hand and Spanish and Romanian on the other. On closer scrutiny, it might also turn out that rhetorical questions whose answer is presupposed to be obvious in the input context, as in (88), are not felicitous in Spanish and Romanian either. Our Italian informants uniformly rejected rhetorical questions with PF.

(88) *Carla and Livia are roommates. Carla asks Livia to make her a sandwich.*
#**Sarò** tua madre$_F$?
be:FUT.1SG your mother
'Am I your mother?'

The same is true for rhetorical questions with a positive answer, as illustrated in (89) where the answer is 'the speaker'.

(89) *I expect that Ugo will choose me to lead his election campaign. After all,*
#Chi gli **avrà** **dato** i soldi per organizzare la festa?
who to.him have:FUT.3SG give:PP the money for organize:INF the party
'Who gave him the money to organize the party?'

Under the assumption that it is common knowledge that the speaker provided the money for the party, (89) is a rhetorical question whose point is to stress the obviousness of the answer. As expected, PF is not felicitous in this case.

We conclude that the semantics of PF developed in Section 3 extends to interrogatives without further modification.

5 Conclusion and open issues

To summarize, we have argued that PF in Italian has the semantics of a subjective comparative modal: a sentence with the logical form $PF(S)$ asserts that an evaluating agent finds p, the proposition expressed by S, subjectively more likely than any other alternative to p in a set of propositions C. C is a subset of the focus semantic value of the prejacent sentence. We have also argued that the choice of PF over an epistemic modal triggers the implicature that the speaker is not in a position to appeal to what she knows in order to support her credence in the prejacent. More specifically, PF implicates that there is no set of privileged, direct information relevant to the QUD and available to the speaker in the context that would support the prejacent. Hence, the observation that PF is used to express a guess concerning an answer to the QUD. The proposed account covers PF in both declarative and interrogative sentences, and predicts the possibility of its occurrence in embedded contexts, though the constraints on embedded PF have not been explored here. According to this account, PF is used to express a particular type of weakened commitment to the prejacent in the case of declaratives, and to elicit such a commitment in the case of interrogatives. The semantics of PF proposed above results in a special type of commitment nuance, one that involves an agent choosing among alternatives based on her beliefs and her credence.

There are two further non-temporal uses of the future in Italian that have been discussed in the literature (cf. Squartini 2012). The first is its use in echo sentences rejecting a previous statement, as shown in (90).

(90) A: Sei stupido.
be:PRS.2SG stupid
'You are stupid.'
B: Stupido **sarai** tu$_F$.
stupid be:FUT.2SG you
'You are the stupid one.'

The second, more widely attested in other languages, is the future used in concessive clauses, exemplified in (91).[35]

(91) *Gianni studied for days.*
Avrà pure **studiato** [per giorni]$_F$, però non ha comunque
be:FUT.3SG also study:PP for days but not have:PRS.3SG anyways
passato l'esame.
pass:PP the-exam
'He might have studied for days, but he still failed the exam.'

We leave to the future a discussion of whether and how these occurrences are connected to the ones we have discussed here.

Going beyond Italian, there are two interrelated questions that arise at this point. The first concerns the issue of why it is that the future tense has this type of non-temporal interpretation not only in Italian but in other languages as well. The second concerns identifying the cross-linguistic similarities and differences found in languages that have PF-like uses of the morphological future tense.

Answering the first question requires comparing various existing theories of the temporal future (cf. Copley 2009; Kaufmann 2005; Condoravdi 2003; Cariani and Santorio 2018, among others), a task that is beyond the scope of this paper. For the time being, we can only offer some initial remarks. Note first that the connection between temporal and modal-like uses of the morphological future tense cannot be so tight as to directly derive one from the other, given that not all languages exhibit such a connection. Note also that an account that derives one use of the future from the other would rule out the situation found in Romanian, where there are two morphologically distinct future forms that are synonymous in their temporal use but contrast in that only one of them is also compatible with a PF-like interpretation. (For discussion, see Irimia (2010) and Fălăuş (2014).)

The connection between PF, modal interpretations and the future is nevertheless real. Exactly how to capture it is, however, far from clear. First, note that the connection between future tense morphology and modality has been argued convincingly in the literature (Enç 1996; Abusch 1997; Copley 2009; among many others). Furthermore, such morphology is often historically derived from deontic or desiderative expressions, as noted in Bybee and Pagliuca (1987), for instance. Bybee and Pagliuca suggest that non-temporal interpretations of the future tense are often connected to the modal origin of future morphology. They note that PF-like interpretations of future morphology in Romance languages, Dutch, and in the case of the Korean *be*-future, arise when temporal future morphology originates in expressions denoting deontic modality. If

[35] Concessive uses of the non-temporal future have been investigated for example by Squartini (2012) and Baranzini and Mari (2019).

this suggestion is correct, the semantic connection we should explain is the three-way connection between deontic modality, PF, and the future. For now, we can only say that using the future tense to express a particular nuance of weakened epistemic commitment has its roots in the robust connection between future tense morphology and modality.

Turning now to the second question, note that an explanation of the various ways in which future tense morphology can be used to express PF-like nuanced commitment would have to be based on solid semantic micro-variation work that does not exist yet. We hope that the detailed empirical discussion of Italian in Sect. 2 will prove useful in establishing the relevant cross-linguistic generalizations. For now, we can only offer some suggestions concerning cross-linguistic expectations that the account presented here leads us to. We expect that PF-like interpretations of future morphology will be compatible with weakened epistemic commitment to the prejacent. If this commitment is required to be based on the agent's beliefs rather than known facts, we also predict the presence of the obligatory implicature concerning the prejacent being unsettled as far as the evaluating agent is concerned.

Variation may arise concerning the nature, and therefore the possible strength of the agent's commitment. In French, for instance, future morphology has a PF-like interpretation similar to PF in Italian, as shown in (92), from Mari (2018).

(92) *I have been traveling to Japan and stayed at a hotel. I cannot find my watch anymore. My husband utters:*

Tu l'**auras** **laissée** à l'hôtel.
you it have:FUT.2SG leave:PP at the-hotel
'You have presumably left it at the hotel.'

Italian and French contrast, however, in that in French, but not in Italian, the non-temporal use of the future is compatible with the evaluating agent having decisive evidence in favor of the prejacent. This is shown in (93), where the French example is also taken from Mari (2018) (bold-face is ours).

(93) *My husband and I are watching the Roland Garros final and see Nadal winning. My husband utters:*

a. Et voilà, Nadal **aura** encore **gagné**.
and there Nadal have:FUT.3SG again win:PP.
'And there you go, Nadal has won again.'

b. #Ecco, Nadal **avrà** **vinto** ancora.
there Nadal have:FUT.3SG win:PP again.
'And there you go, Nadal has won again.'

A similar point can be made about the relation between PF in Italian and the non-temporal uses of *will* in English. Italian PF and *will* overlap in some cases, as shown in (94) from Winans (2016).

(94) *Dad is painting his neighbor's kitchen. Reid wants to watch. Reid asks Mom if he can go next door and watch Dad paint. She knows that paint causes fumes so she says: "You can't go there ....*

a. It will be hard to breathe in there (right now).
b. **Sarà** difficile respirare là dentro (adesso).
be:FUT.3SG difficult breathe:INF there inside (now)
'It is presumably difficult to breathe in there (now).'

However, Winans argues that non-temporal *will* cannot be used when inferring a cause from an effect, while this constraint is not valid in Italian. For example, *will* is disallowed in (95) where—according to Winans—the speaker utters the future sentence to express her inference about the cause of the sculpture's melting, while the Italian equivalent is fine.

(95) *There is a large sculpture in the middle of the party. You thought that it was made of glass but you now see that it's beginning to melt. You say:*
a. #The swan will be made of ice.
b. Il cigno **sarà** **fatto** di ghiaccio$_F$.
the swan be:FUT.3SG make:PP of ice
'The swan is presumably made of ice.'

Conversely, in some of the contexts discussed above the non-temporal use of *will* is fine in English but PF in Italian is not.

The last issue we mention and leave open is the question of how PF compares with modal particles such as *wohl* in German or *darou* in Japanese, which have similar though not identical effects. (See Eckardt (2020) and references therein for *wohl*, and Uegaki and Roelofsen (2018) and references therein for *darou*.) Common to all these forms is that they are used as means of nuancing commitment to the prejacent. To illustrate the kind of questions that one should explore further consider (96), illustrating a use of *wohl* where the truth of its prejacent is supported by factual evidence (Göbel 2017).

(96) *A claims that Athens is in Turkey. B provides a map that clearly proves A to be wrong, whereupon A says to B:*
Da hab ich mich wohl geirrt.
there have I me wohl erred
'Apparently, I was wrong. (Göbel 2017: example (8))'

Here A concludes, based on reliable evidence, that her previous geographical beliefs were erroneous. Were A to speak Italian, acknowledging her mistake by using the PF statement in (97) would not be appropriate:

(97) *Same context as the previous example.*
#Avrò **sbagliato**.
have:FUT.3SG err:PP
'I must have been mistaken. '

Our account predicts the infelicity of (97) in this context: since A's evidence is reliable, it settles the issue whether p, and therefore such a scenario is incompatible with PF; after looking at the map, A's epistemic state will entail that Athens is in Greece, and

that her previous beliefs were wrong, and therefore NPI will no longer be met. This and other differences between PF and evidential particles should be explored further.

Finally, we note that PF is related to but different from the 'future verification' use of the future. In the latter use, the future time reference is not that of the eventuality described in the prejacent but rather, the time of its verification (cf. Mari 2012). Here, we are merely going to point out that Italian PF is not a future of verification: if it were, PF would not be felicitous in cases where future verification of the prejacent is not possible. However, as shown in (98), PF is fine even when future verification is impossible: Mary can felicitously use PF knowing full well that there will be no time when she (or anybody else) will be able to verify whether her childhood pictures where in a box in the attic.

(98) *Aldo and Bea are standing in front of what remains of their house after a fire has just burnt it down. Aldo says "I wonder where our childhood pictures were kept". Bea replies*:

Saranno **state** in qualche scatola nell'attico
be:FUT.3SG be:PP in some box in.the attic
'They would have been in some box in the attic.'

Accounting for the non-temporal use of the future in a particular language, as we have done above, provides, we hope, the basis for future explorations of the semantics of such non-temporal interpretations of the future across languages, as well as for understanding the similarities and differences between PF and the use of modal particles in languages like German and Japanese or evidential systems elsewhere.

References

Abusch, D. (1997). Sequence of tense and temporal de re. *Linguistics and Philosophy, 20*, 1–50.

Anand, P. (2009). *Kinds of taste*. Ms.,UCSC.

Anand, P., & Hacquard, V. (2013). Epistemics and attitudes. *Semantics & Pragmatics, 6*(8), 1–59.

Baranzini, L., & Mari, A. (2019). From epistemic modality to concessivity: Alternatives and pragmatic reasoning per absurdum. *Journal of Pragmatics, 142*, 116–138.

Bertinetto, P. (1979). Alcune ipotesi sul nostro futuro (con alcune osservazioni su "potere" e "dovere"). *Rivista di Grammatica Generativa, 1–2*(4), 77–138.

Bybee, J., & Pagliuca, W. (1987). The evolution of future meaning. In A. Gicalone, O. Carruba, & G. Bernini (Eds.), *Papers from the Seventh International Conference on Historical Linguistics* (pp. 109–120). Amsterdam: John Benjamins.

Cariani, F. (2013). Epistemic and deontic should. *Thought, 2*(1), 73–84.

Cariani, F., & Santorio, P. (2018). Will done better: Selection semantics, future credence, and indeterminacy. *Mind, 127*(505), 129–165.

Condoravdi, C. (2003). Moods and modalities for *will* and *would*. Handout for a talk given at the Amsterdam Colloquium, December 2003.

Copley, B. (2009). *The semantics of the future*. Routledge.

Eckardt, R. (2020). Conjectural questions: The case of German verb-final wohl questions. *Semantics & Pragmatics, 13*(9), 1–17.

Eckardt, R., & Beltrama, A. (2019). Evidentials and questions. In C. Piñón (Ed.), *Empirical Issues in Syntax and Semantics 12* (pp. 1–35). Paris: CNRS.

Enç, M. (1996). Tense and modality. In S. Lappin (Ed.), *The handbook of contemporary semantic theory* (pp. 633–657). Oxford: Blackwell Publishers.

Fălăuş, A. (2014). Presumptive mood, factivity and epistemic indefinites in Romanian. *Borealis Academic Publishing, 3*(2), 105–124.
Fălăuş, A., & Laca, B. (2014). Les formes de l'incertitude. Le futur de conjecture en espagnol et le présomptif futur en roumain. *Revue de Linguistique Romane, 78*, 313–366.
Farkas, D. (2003). *Assertion, belief and mood choice*. Paper presented at ESSLI, Vienna.
Farkas, D. F., & Bruce, K. B. (2010). On reacting to assertions and polar questions. *Journal of Semantics, 27*, 81–118.
Frana, I., & Menéndez-Benito, P. (2015). Embedding the epistemic future in italian and spanish. Poster presented at *Sinn und Bedeutung 20*.
Frana, I., & Menéndez-Benito, P. (2019). Evidence and bias. The case of the evidential future in Italian. *Proceedings of SALT, 29,* 727–747.
Giannakidou, A., & Mari, A. (2013). The future of Greek and Italian: An evidential analysis. *Proceedings of Sinn und Bedeutung, 17*, 255–270.
Giannakidou, A., & Mari, A. (2017). A unified analysis of the future as epistemic modality. *Natural Language and Linguistic Theory, 36*, 85–129.
Göbel, A. (2017). Evidentiality and undirected questions: A new account of the German discourse particle *wohl*. *University of Pennsylvania Working Papers in Linguistics,24*(1), 77–86.
Hacquard, V., & Wellwood, A. (2012). Embedding epistemic modals in English: A corpus-based study. *Semantics & Pragmatics, 5*(4), 1–29.
Ippolito, M. (2017). Constraints on the embeddability of epistemic modals. *Proceedings of Sinn und Bedeutung, 21*(1), 605–622.
Ippolito, M., & Farkas, D. F. (2019). Epistemic stance without epistemic modals: The case of the presumptive future. *Proceedings of SALT, 29*, 459–476.
Irimia, M.-A. (2010). Some remarks on the evidential nature of the Romanian presumptive. In R. Bok-Bennema, B. Kampers-Manhe, & B. Hollebrandse (Eds.), *Selected papers from Going Romance* (pp. 125–144). Amsterdam: John Benjamins.
Kaufmann, S. (2005). Conditional truth and future reference. *Journal of Semantics, 22*, 231–280.
Kölbel, M. (2003). Faultless disagreement. *Proceedings of the Aristotelian Society, 104*, 53–73.
Korotkova, N. (2016). Disagreement with evidentials: A call for subjectivity. In J. Hunter, M. Simons, & M. Stone (Eds.), *The 20th Workshop on the Semantics and Pragmatics of Dialogue* (pp. 65–75). New Brunswick, NJ: Rutgers University Press.
Korotkova, N. (2019). *Status of the evidential requirement*. Ms., University of Konstanz/University of Tübingen.
Kratzer, A. (2009). Modals and context-dependency. Colloquium, Harvard University, February 20.
Lasersohn, P. (2005). Context dependence, disagreement, and predicates of personal taste. *Linguistics and Philosophy, 28*, 643–686.
Lauer, S. (2014). Mandatory implicatures in gricean pragmatics. In J. Degen, M. Franke, and N. Goodman (Eds.), *Proceedings of the Formal and Experimental Pragmatics Workshop* (pp. 21–28). Tübingen.
Littell, P., Matthewson, L., & Peterson, T. (2009). On the semantics of conjectural questions. In M. Schenner, R.-M. Déchaine, T. Peterson, & U. Sauerland (Eds.), *Evidence from evidentials* (pp. 89–104). Vancouver, BC: University of British Columbia.
Mandelkern, M. (2018). *What "must" adds*. All Souls College: Oxford University.
Mari, A. (2012). *On the evidential nature of the Italian future*, HAL, archives-ouvertes.fr edition.
Mari, A. (2018). The french future: Evidentiality and incremental information. In A. Foolen, H. de Hoop, & G. Mulder (Eds.), *Evidence for evidentiality* (pp. 199–226). Amsterdam: John Benjamins.
Matthewson, L., Rullmann, H., & Davis, H. (2008). Evidentials as epistemic modals: Evidence from St'át'imcets. *The Linguistic Variation Yearbook, 7*, 201–254.
Mihoc, T. (2014). The Romanian future-and-presumptive auxiliary. *McGill Working Papers in Linguistics 24(1)* 64–80.
Mihoc, T., Bhadra, D., & Falaus, A. (2019). Epistemic modals, deduction, and factivity. *Proceedings of SALT, 29*, 351–370.
Murray, S. (2010). *Evidentiality and the structure of speech acts*. Ph.D. thesis, Rutgers University.
Papafragou, A. (2006). Epistemic modality and truth conditions. *Lingua, 116*, 1688–1702.
Pietrandrea, P. (2005). *Epistemic Modality. Functional properties and the Italian system*. Amsterdam: John Benjamins.
Roberts, C. (1996). Information structure in discourse: Towards an integrated formal theory of pragmatics. *The Ohio State University Working Papers in Linguistics (OSUWPL), 49*, 91–136.

Roberts, C. (2017). Agreeing and assessing: Epistemic modals and the question under discussion. Ms., OSU and NYU.
Roelofsen, F., & Farkas, D. (2015). Polarity particle responses as a window onto the interpretation of questions and assertions. *Language, 91*(2), 359–414.
Rooth, M. (1996). Focus. In S. Lappin (Ed.), *The handbook of contemporary semantic theory* (pp. 271–297). Oxford: Blackwell.
Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics, 1*, 75–116.
Squartini, M. (2012). Evidentiality in interaction: The concessive use of the Italian future between grammar and discourse. *Journal of Pragmatics, 44*(15), 2116–2128.
Stephenson, T. (2007). Judge dependence, epsitemic modals, and predicates of personal taste. *Linguistics and Philosophy, 30*(4), 691–706.
Uegaki, W., & Roelofsen, F. (2018). Do modals take propositions or sets of propositions? Evidence from Japanese darou. *Proceedings of SALT, 28*, 809–829.
Veltman, F. (1996). Defaults in update semantics. *Journal of Philosophical Logic, 25*(3), 221–261.
von Fintel, K., & Gillies, A. (2011). *Might* made right. In A. Egan & B. Weatherson (Eds.), *Epistemic modality* (pp. 108–130). Oxford: Oxford University Press.
von Fintel, K., & Iatridou, S. (2008). How to say Ought in foreign: The composition of weak necessity modals. In J. Guéron & J. Lecarme (Eds.), *Time and modality* (pp. 115–141). Dordrecht: Springer.
Winans, L. D. (2016). *Inferences of 'will'*. Ph.D. thesis, UCLA.
Yalcin, S. (2016). Modalities of normality. In N. Charlow & M. Crisman (Eds.), *Deontic modality* (pp. 230–255). Oxford: Oxford University Press.