

Future/epistemic ambiguities as height-relativity: Evidence from Gujarati¹

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Abstract. Epistemic claims and future claims often involve the same morpheme (Enç, 1996; Kush, 2015; Winans, 2016; Giannakidou and Mari, 2018). This paper argues that, in some languages, this is because apparent reference to future times is quantification over future worlds. This assimilates the epistemic/future parallel to variable-flavor modality. I introduce novel data from Gujarati (Indo-Aryan), which allows only epistemic readings of the morpheme *-s-* when it is placed on the auxiliary verb (*hovu*, ‘to be’), and only future readings when on main verbs. I provide a univocal analysis of the morpheme, where *-s-* contributes universal modal force, but the modal base (epistemic vs. metaphysical) is determined by syntactic position (following Hacquard, 2006). I also show *-s-* can scope under negation, strengthening the claim that *-s-* is a necessity modal.

Keywords: epistemic modality, future, height-relativity, variable-flavor modality, auxiliaries.

1. Introduction

Cross-linguistically, the sentences used to make claims about the future can morphologically resemble those used to make claims under epistemic modality – claims pertaining to the goodness of inference based on what is known (Enç, 1996). This is seen, for instance, with English *will* or its cliticized form *'ll*² (Hornstein, 1990; Enç, 1996; Copley, 2009; Winans, 2016):

- (1) a. She'll be in her office (tomorrow). (future)
b. She'll be in her office (right now). (epistemic)

However, it has been contested how distinct these claims are. Enç attributes the view to Otto Jespersen that “we know less about the future and that therefore we talk about it in a more vague way”, buttressing a theory where future claims must always involve some sort of epistemic inference (Giannakidou and Mari, 2018).

Contrary to that view, the present paper provides novel evidence from Gujarati (Indo-Aryan; Western India) suggesting that future claims and epistemic claims *are* distinct, even though both are modal. This view treats ambiguities between future and epistemic readings of a morpheme as special cases of ‘variable-flavor’ modality, a much more pervasive phenomenon (Kratzer, 1977). The ambiguity in question is that of a morpheme *-s-*.³

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²I (and other speakers I have asked) find the epistemic reading impermissible with the uncliticized *will*, but find both future and epistemic readings acceptable with *'ll*.

³For some speakers, this is pronounced as *-š-*. In traditional grammars, the morpheme is often glossed FUT (e.g.

Gujarati sentences with similar meanings to those in (1) both involve the morpheme *-s-*, as shown below (*-s-* in boldface):

- (2) a. Gujarat Titans *jiit-s-e* (future)
Gujarat Titans win-**S**-AGR

‘The Gujarat Titans will win.’

- b. Gujarat Titans *jiit-t-aa* *ha-s-e* (epistemic)
Gujarat Titans win-IMPf-AGR AUX-**S**-AGR

‘The Gujarat Titans must be winning.’

However, unlike the English *She’ll be in her office*, which may be used to make an epistemic claim or a future claim, the sentences in (2) are unambiguous: (2a) can only be used to make a claim about the future; (2b) can only be used to make an epistemic claim. The flexibility *-s-* shows cannot merely be in a contextually-provided ‘conversational background’ (Kratzer, 1981), the set of propositions which serve as the basis of the modal claim. So, there is a genuine ambiguity. What kind of ambiguity justifies these distinct uses of *-s-*?

I will argue that this ambiguity is not lexical. Instead, the reading obtained with *-s-* is determined by its syntactic context (Hacquard, 2006, 2010; Kratzer, 2012). Specifically, I will argue that the generalizations in (3) hold, suggesting that choice of *-s-*’s modal base is conditioned by where it merges in the clause:

- (3) a. *-s-* + TP = EPIS
b. *-s-* + VP = FUT

I argue that *-s-* is monosemous. It is always interpreted as a necessity modal, but is underspecified with respect to its modal flavor. Modal flavor is then determined, like the content of anaphors, as a function of syntactic position (cf. Cinque 1999).

The main contribution of this paper is the characterization of the empirical pattern in Gujarati. I also sketch an analysis towards the end of the paper where there are three syntactic positions available for modals – above TP, above AspP, and above VP. The future reading results when *-s-* is above AspP but below TP.

This paper is organized as follows. Section 2 sketches the distribution of the epistemic/future readings of *-s-*, and offers some *prima facie* reasons for believing that there is only one *-s-*. I offer here a descriptive generalization: *-s-* is read as an epistemic modal just in case it is affixed to an auxiliary verb. In Section 3, I build on this, showing that *-s-* consistently passes diagnostics which suggest it is a necessity modal, whether affixed to a main verb or an auxiliary verb, but it only passes diagnostics of being an epistemic modal when affixed to the auxiliary. I then argue in Section 4.1, on morphosyntactic grounds, that *-s-*’s affixation to the auxiliary is really the

Cardona, 1965), but it is here simply left unglossed as *-S-*. See Sharma (2008) and Kush (2011; 2015) on Hindi *-gaa*, for facts related to those discussed in this paper.

result of its being syntactically high. This means the generalization at hand is that *-s-* is read as an epistemic necessity modal whenever it is syntactically high – a generalization familiar from the literature. I suggest that a height-relative theory like Hacquard’s (2006; 2010) could be made to capture these facts about Gujarati, but point out that some adjustments would need to be made for a full account. Section 5 concludes, noting some implications for the theory of talk about the future.

2. There is only one *-s-*; syntax conditions the distribution of the epistemic reading

This section develops claim that *-s-* is read as future just in case it is affixed to a main verb, and as epistemic just in case it is affixed to an auxiliary verb (which is always *hovu* ‘to be’), though it shows a single ‘core meaning’, being a necessity modal in both of these uses. I offer some *prima facie* morphosyntactic reasons for believing that there is only one *-s-* in both epistemic and future uses (i.e., there is no lexical ambiguity).

Syntactically speaking, *-s-* may appear in either of two places: on a main verb ((2a) repeated here as (4)), or on an auxiliary, as in (5). Gujarati has only one auxiliary: the verb *hovu* ‘to be’.

- (4) Gujarat Titans *jiit-s-e* (future)
Gujarat Titans win-S-AGR

‘The Gujarat Titans will win.’

- (5) a. Gujarat Titans *jiit-t-aa* *ha-s-e* (epistemic)
Gujarat Titans win-IMPF-AGR AUX-S-AGR

‘The Gujarat Titans must be winning.’

- b. Gujarat Titans *jiit-y-aa* *ha-s-e*
Gujarat Titans win-PFY-AGR AUX-S-AGR

‘The Gujarat Titans must have won.’

When the main verb is marked with (overt) aspectual morphology, other tense/aspect/mood morphemes *must* appear on the auxiliary. In (5), the auxiliary verb must be there to host *-s-*, due to the presence of the aspectual morphemes on the the stem *jiit* ‘win’. I return to the details of the distribution later, in §4.1. For now, what is important to note is that the reading of *-s-* as future or as epistemic correlates perfectly with the presence of the auxiliary.

Epistemic readings really do appear to be conditioned by the presence/absence of the auxiliary, and not, say, by the stativity of the prejacet. One might have imagined that aspectual morphology on the main verb in (5) stativizes it, and having a stative prejacet triggers an epistemic reading of the modal.⁴ But this hypothesis would predict that lexically stative verbs trigger epistemic readings of *-s-*, even in the absence of the auxiliary. This prediction is not borne out:

⁴I mention this to make explicit that *-s-* does not behave like English *must* in this regard. Ramchand (2015) claims stativity-sensitivity is seen with English *must*: it can be read as epistemic only when its prejacet is stative, as

- (6) kha-vaa-n-u ta-ne bhaav-s-e
eat-GER-GEN-N you-DAT be.tasty-**S**-AGR

‘The food will be tasty to you (later).’ (stative V; future only =)
#‘The food must be tasty to you (right now).’

In (6), a stative verb, *bhaavu* ‘to be tasty’, fails to license an epistemic reading of -s-. When the auxiliary is added, the epistemic reading becomes obligatory:

- (7) kha-vaa-n-u ta-ne bhaav-t-u ha-s-e
eat-GER-GEN-N you-DAT be.tasty-IMPf-AGR AUX-**S**-AGR

‘The food must be tasty to you (right now).’
#‘The food will be tasty to you (later).’

So, stativity *per se* cannot be responsible for the epistemic reading.

In further support of the claim that the auxiliary correlates perfectly with the epistemic reading of -s-, observe also that the epistemic reading of -s- is forced even on predicative uses of *ho-vu* ‘to be’ – a future reading is unavailable in (8b).

- (8) a. e doktor chh-e
3P doctor AUX.PRES-AGR

‘He is a doctor.’

- b. e doktor ha-s-e
3P doctor AUX-**S**-AGR

‘He must be a doctor (now).’
#‘He will be a doctor (later).’

To express the future meaning, the main verb *thavu* ‘to become’ must be used instead:

- (9) e doktor tha-s-e
3P doctor become-**S**-AGR

‘He will become a doctor.’

At this point, one may wonder whether there are two distinct -s-es, one which appears on the auxiliary, with an epistemic meaning, and one which appears on the main verb, with a future meaning. A simple reason to doubt the lexical ambiguity hypothesis is that it does not account

shown in (i).

- (i) a. Al must go to Philly today. (eventive prejacent, root only)
b. Al must be in Philly today. (stative prejacent, root/epistemic)

for the fact that the two *-s*-s trigger the same irregular allomorphs of person morphology. While the elsewhere allomorph for 1SG-agreement morphology is *-u*, as in (10):

- (10) *hũ vāch-Ø-u*
 1PS read-PRES-AGR.1SG

‘I read.’

But with *-s*-, an allomorph, *-i-* is triggered – both in epistemic and future readings.

- (11) a. *hũ tjar-ē vāch-i-s*
 1PS then-LOC read-AGR.1SG-S

‘I will read at that time.’

- b. *hũ tjar-ē vāch-t-o ho-i-s*
 1PS then-LOC read-IMP-AGR AUX-AGR.1SG-S

‘I must be reading at that time.’

This is most straightforwardly explained by assuming that *-s-* is the same morpheme in both (11a) and (11b), triggering the same irregular allomorph of AGR.1SG.

But for semantic purposes, it seems we want to treat *-s-* as a variable-flavor modal. Establishing the details of this is the focus of the next section.

3. *-s-* is an epistemic modal only when on the auxiliary, but is always a modal

This subsection argues that, while *-s-* is always modal, it behaves as an epistemic modal only when affixed to the auxiliary. When *-s-* is affixed to the auxiliary, it obeys a number of cross-linguistic generalizations applicable to epistemic necessity modals. Crucially, it does not obey these generalizations when affixed to the main verb. The first two subsections establish that *-s-* is always a necessity modal. The last three subsections establish that it is only sometimes an epistemic modal. This is all argued in support of the view that *-s-* is a variable-flavor modal.

3.1. Modal subordination

To first see that *-s-* is always a modal, observe that it participates in modal subordination. Modal subordination has been considered the strongest diagnostic for modality in future constructions (Klecha, 2014; Cariani and Santorio, 2018; Cariani, 2021; Mendes, 2024). Even in its future use, *-s-* shows subordination (cf. Roberts (1989), Klecha (2014) on *will*):

- (12) *bomb-n-i paas-e nai ja-o! e fuut-s-e*
 bomb-GEN-FEM near-LOC NEG go-IMP.PL, 3P explode-S-3P

‘Don’t go near the bomb! It’ll explode (if you go near it).’

Importantly, modal subordination is specific to a future claim made using the morpheme *-s-*. Other future claims made without *-s-* do not behave as though they involve modality (in the sense that they do not pass this diagnostic). This is shown in (13); *-vaa*, a gerundive morpheme (like *going to*) does not show modal subordination:

- (13) bomb-n-i paas-e nai ja-o! e fuut-**vaa**-n-u chh-e
 bomb-GEN-FEM near-LOC NEG go-IMP.PL, 3P explode-**VAA**-GEN-N AUX.PRES-3P

‘Don’t go near the bomb! It’s going to explode (whether you go near it or not).’

Modal subordination gives us a strong reason to say *-s-* specifically is a modal.

3.2. Scope-taking

Necessity modals can also take scope with respect to negation. The epistemic modal shows scope with respect to negation (when in an embedded clause; if they are clausemates, the epistemic always outscopes negation in Gujarati):

- (14) a. Varsaad pad-t-u nai ha-s-e
 rain fall-IMPF-NEUT NEG AUX-**S-3**

‘It must not be raining.’

□ » ¬

- b. Ev-u nathi ke varsaad pad-t-u ha-s-e
 that-GEN NEG.be.PRES that rain fall-IMPF-NEUT AUX-**S-3**

‘It isn’t that it must be raining.’

¬ » □

More surprisingly, the future use *also* shows scope-taking behavior, as shown in (15). This is curious given claims about other future-modals like English *will* where they do *not* show scope-taking behavior (Cariani and Santorio, 2018).

- (15) a. Varsaad nai pad-s-e, #(pan pad-i sak-e)
 rain NEG fall-**S-3** but fall-LINK can-PRES.3

‘It won’t rain, (#though it could).’

□ » ¬

- b. Ev-u nathi ke varsaad pad-s-e, (pan pad-i sak-e)
 that-GEN NEG.be.PRES that rain fall-**S-3** but fall-LINK can-PRES.3

‘It isn’t that it must rain in the future (though it could).’

¬ » □

In the use of (15b), the speaker leaves it open whether or not it will rain. They have not committed to it not raining, unlike the English *It is not the case that it will rain*.

But in this way, Gujarati *-s-* is more well-behaved than its English counterpart *will*. It takes scope exactly in the way one would expect if it were a universal quantifier over possible worlds, i.e., a necessity modal; and under negation, a possibility reading obtains, just as expected.

The last two subsections give us strong reason to think that *-s-*, in both future and epistemic uses, is a necessity modal. An account which maintained that there is just one *-s-*, a necessity modal, would deliver this fact straightforwardly.

In light of this, we now we turn more directly to evidence that *-s-* is not merely general between the two meanings, showing that it passes diagnostics of epistemic modality in only one of these uses. That is, we now turn to some differences between the epistemic use and the future use (but from now, taking it for granted that these are distinct uses of one and the same lexical item).

3.3. Temporal orientation

Naturally, the future reading differs from the epistemic reading in ‘temporal orientation’ – the time at which the prejacent must hold (Condoravdi’s 2002 terminology). While the future use is (naturally) future-oriented, epistemic *-s-* can be present oriented (18) and past oriented (18).

CONTEXT: You are watching a cricket match between the Gujarat Titans and the Rajasthan Royals. One of your friends, a Titans fan, says:

- (16) Gujarat Titans *jiit-s-e* (Future)
Gujarat Titans *win-S-AGR*

‘The Gujarat Titans will win.’ $\top$ at any time.

- (17) Gujarat Titans *jiit-t-aa* *ha-s-e* (Epistemic)
Gujarat Titans *win-IMPF-AGR* *AUX-S-AGR*

‘The Gujarat Titans must be winning.’ $\top$ only while G.T. are ahead.

- (18) Gujarat Titans *jiit-y-aa* *ha-s-e* (Epistemic)
Gujarat Titans *win-PFV-AGR* *AUX-S-AGR*

‘The Gujarat Titans must have won.’ $\top$ only after G.T. win.

What is more interesting is that this appears to be an instance of a generalization that applies to epistemic necessity modals: they can *never* be future-oriented (Lekakou and Nilsen, 2009; Winans, 2016; Williamson, 2021; Mendes, 2023). Furthermore, non-epistemics tend to be future-oriented (Condoravdi, 2002; Werner, 2007; Thomas, 2014; Klecha, 2016; Rullmann and Matthewson, 2018; Van Dooren et al., 2022). The asymmetry in temporal orientation shown above could reduce to an epistemic/non-epistemic distinction.

3.4. Indirectness

Epistemic modals are often held to have an ‘indirectness’ requirement (Karttunen, 1972; von Stechow, 2000; von Stechow and Gillies, 2010; Winans, 2016; Goodhue, 2017; Mandelkern, 2019), illustrated in (19):

- (19) a. (Looking at the damp umbrellas of people coming inside.) It must be raining.
 b. (Looking out of the window, seeing water fall from the sky.) # It must be raining.

We need not be detained by what it means for the relation of the speaker to the evidence to be ‘indirect’. What is important here is that Gujarati *-s-* shows the same effect.⁵

CONTEXT A: your friend Gauri, who is a cricket fan and has a good sense of the ability of the relevant cricket teams, walks in. You ask her how she thinks the match is going, but she has not been following today’s match. Nevertheless, she ventures an opinion. She says: ✓(20a)/✓(20b)

CONTEXT B: Your friend Gautam is looking at the TV screen, where the cricket score is displayed, who doesn’t know very much about cricket. The Gujarat Titans are ahead by so many runs that there is no way the Royals catch up. He says: ✓(20a)/#(20b)

- (20) a. Gujarat Titans *jiit-s-e* (Future; ✓A/✓B)
 Gujarat Titans *win-S-AGR*
 ‘The Gujarat Titans will win.’
 b. Gujarat Titans *jiit-t-aa* *ha-s-e* (Epistemic; ✓A/# B)
 Gujarat Titans *win-IMPF-AGR AUX-S-AGR*
 ‘The Gujarat Titans must be winning.’

That is, your friend must be inferring from knowledge of the teams’ abilities (or some other source), not merely *observing* that the Gujarat Titans are winning. Otherwise, they cannot felicitously say that the sentence in (20b). Looking at the TV screen and seeing the score puts the speaker in too direct a relation to the evidence to use an epistemic modal. And, again, this behavior is seen only when *-s-* is affixed to the auxiliary verb.

3.5. Embeddability under preferentials

Anand and Hacquard (2008) observe that epistemic necessity modals (including weak ones like *might*) are unacceptable in the complement clauses of certain attitude verbs:

⁵Valentine Hacquard (p.c.) points out that there is a sense in which (20a) is also indirect (there is a chain of reasoning from the score to the winning). But the contrast in felicity does show that there is a relevant difference between the future and epistemic uses of *-s-*, even if directness *per se* is not responsible.

- (21) a. John {believes, argues, assumed} that the Earth must be flat.
 b. #John {hopes, wishes, commanded} that the Earth must be flat.

Specifically, those attitude verbs which do not purport to represent the world in some way ('preferentials') disallow epistemic necessity modals in their prejacents. Gujarati *-s-* is unembeddable under such verbs – but only when it is affixed to the auxiliary verb.

When affixed to a main verb, *-s-* receives a future reading, and is acceptable in the complement clause of preferentials (23):

- (22) Pranav-ne {laag-y-u, tha-y-u} ke varsād pad-s-e
 Pranav-DAT believe-PFV-N seem.to-PFV-N that rain fall-S-AGR

'Pranav believed that it will rain'/'It seemed to Pranav that it will rain.'

- (23) Pranav-ne {jo-y-e, iccha chh-e} ke varsād pad-s-e
 Pranav-DAT want-PFV-N wish be.PRES-AGR that rain fall-S-AGR

'Pranav wants that it will rain'/'Pranav wishes that it will rain.'

And again, there is a contrast with epistemic *-s-*. When *-s-* is affixed to an auxiliary, it cannot be embedded under preferential verbs (25):

- (24) Pranav-ne {laag-y-u, tha-y-u} ke varsād pad-t-u ha-s-e
 Pranav-DAT believe-PFV-N seem.to-PFV-N that rain fall-IMP-AGR AUX-S-AGR

'Pranav believed that it will rain'/'It seemed to Pranav that it will rain.'

- (25) #Pranav-ne {jo-y-e, iccha chh-e} ke varsād pad-t-u ha-s-e
 Pranav-DAT want-PFV-AGR wish be.PRES that rain fall-IMP-AGR AUX-S-AGR

'Pranav wants that it must be raining'/'Pranav wishes that it must be raining.'

The first two subsections of this section showed that *-s-* always behaves like a modal, participating in modal subordination and scope-taking behavior. But the last three subsections show that only when affixed to an auxiliary does *-s-* validate diagnostics of epistemic modality. Why is this the case? The next section argues that affixation to an auxiliary is really a symptom of being syntactically higher, and that modal flavor is a function of syntactic height. Thus, being on the auxiliary correlates with the modal's flavor.

4. Prolegomena to a theory of the future/epistemic

This section argues that the auxiliary is a diagnostic for syntactic height. The generalization the bulk of this paper has defended – *-s-*'s epistemicity is conditioned by affixation to an auxiliary

verb – is really to be understood in terms of syntactic height, rather than affixation to an auxiliary *per se*. I suggest that this allows us to draw a connection to previous work relating syntactic height to modal flavor (Hacquard, 2006, 2010).

4.1. The auxiliary is semantically vacuous; diagnoses syntactic height

If the affix is on an auxiliary, it is higher than if it is on the main verb (Ross, 1969; Cinque, 1999). I want to note also that Gujarati shows a morphosyntactic pattern that means the presence of the auxiliary *per se* cannot be implicated. That is, the auxiliary itself *cannot* have a meaning, but its presence/absence diagnoses the syntactic height of *-s-*, which does have consequences for its interpretation.

As mentioned in §2, when the main verb is marked with (overt) aspectual morphology, if there are other TAM markers, they must appear on the auxiliary. In Bjorkman’s (2011) terms, Gujarati shows an ‘overflow’ pattern.

- (26) a. $V_{\text{main}} + \text{Asp}$
 b. $V_{\text{main}} + -s-$
 c. $*[V_{\text{main}} + \text{Asp} + -s-]$ (T ‘overflows’ off of the stem)
 d. $[V_{\text{main}} + \text{Asp}] + [V_{\text{aux}} + -s-]$ (V_{aux} inserted to host stranded affix)

When V is already marked with overt aspectual morphology, *-s-* ‘overflows’ off of the stem, and requires a different host. The auxiliary is inserted to host *-s-*. While *-s-* *can* appear on V, if Aspect is overt, *-s-* *must* appear on an auxiliary.

Further details are immaterial here. It suffices to say that overflow patterns are best handled on the PF-branch of the grammar (Bjorkman, 2011; Richards, 2016). There is a morphophonological generalization about when the auxiliary is inserted: when the verbal stem is already overtly inflected, and so, cannot host more inflection. For the semantics, the upshot is that the auxiliary *be* is likely not represented in syntax, but is inserted only at PF (in a process of ‘Aux-support’, cf. Lasnik 1981, p. 134 on the ‘stranded affix’ constraint).

So, the auxiliary diagnoses that *-s-* is syntactically higher than it would be, were the auxiliary absent. But the auxiliary itself can have no semantic value, being introduced only on the PF-branch of the grammar (in Morphology). We may now turn to the question of how to relate this to the facts about meaning.

4.2. Towards a semantic analysis: Height-relative determination of flavor

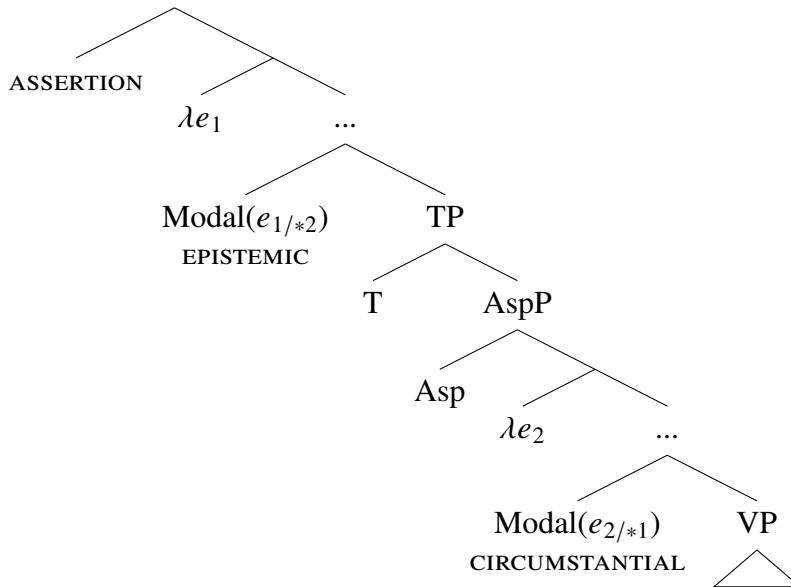
This paper thus far has argued that there is just one *-s-*, which is always a necessity modal, but is unspecified for flavor. *-s-* may merge in two different positions – a high position, above Aspect, and a low position. Where *-s-* has merged is diagnosed by presence/absence of the auxiliary, and this determines whether the claim is epistemic or future. This subsection sketches a height-

relative analysis which might deliver these facts: *-s-*, in the high-position, takes an epistemic modal base, but in the low position, receives a historical modal base.

One way of implementing this follows Hacquard's (2006; 2010) proposal for English and French. This proposal is designed to explain how English modals like *must* and *have to*, and French modals like *devoir*, may receive epistemic and root readings (and the high-scope properties that correlate with an epistemic readings). I will briefly explain this theory, before turning to some adjustments that need to be made for the implementation in Gujarati.

In Hacquard's theory, modals may merge above TP or under AspP. She assumes two syntactically represented event-binders. One is high, related to an assertion event (or the event of an embedding verb, in non-matrix contexts). The other is below Aspect.⁶

(27)



In this theory, modals take an event-argument to determine the modal base. This event-argument is keyed to the syntactically closest event-binder. When the event is one related to propositional content (such as an assertion, or a belief), the modal base consists of the beliefs of the attitude-holder or speaker. Otherwise, the modal takes a circumstantial modal base by default. Thus, the modal is epistemic when high, and root when low.

Thus, Hacquard treats (28) as involving two different merge sites for *devoir* (2010: 84):

- (28) a. Il est 18 heures. Mary n'est pas au bureau. Elle *doit* etre chez elle.
 'It is 6 o'clock. Mary is not at the office. She *must* be at home.'
 $\exists e[\text{Assert}(e, w) \wedge \forall w' [w' \text{ is compatible with the content of } e :$
 $\exists e' [\text{Mary is at home } (e', w')]]]$

⁶Hacquard (2010) assumes of Quantifier Raising of Aspect to derive the placement of this event binder. I do not commit to this here.

In w , there is an event of assertion, and in all the worlds w' compatible with the content of that assertion (the speaker's beliefs), Mary is at home.

- b. Mary veut être à Paris à 17 heures. Elle *doit* prendre le train pour aller à Paris.

‘Mary wants to be in Paris at 5 p.m. She must take the train to go to Paris.’

$\exists e[e \text{ in } w \wedge \forall w'[w' \text{ is compatible with the circumstances of } e : \text{ Mary take the train}(e, w')]]$

There is an event e of Mary taking the train in w , and in all worlds compatible with the circumstances of e , Mary takes the train in w' .

Thus in (28a), the modal ($\forall w'$) takes wide-scope with respect to $\exists e'$, the Aspect quantifier – it merges high. In (28b), the modal takes narrow scope with respect to $\exists e$, as it merges low.

However, the French situation and the Gujarati situation differ in two crucial respects. One is that *devoir* does not get a future reading in (28b), but a root reading. The second difference is that Gujarati *-s-* can express neither priority modality (deontic or bouletic modality; Portner 2009), nor pure circumstantial necessity:

- (29) a. hũ aa chopdii khariid-i-s
I this book buy-AGR-S

‘I will buy this book.’

(future)

#‘I have to buy this book.’

(priority)

- b. hũ chik maar-i-s
I sneeze hit-AGR-S

‘I will sneeze.’

(future)

#‘I have to sneeze.’

(pure circumstantial)

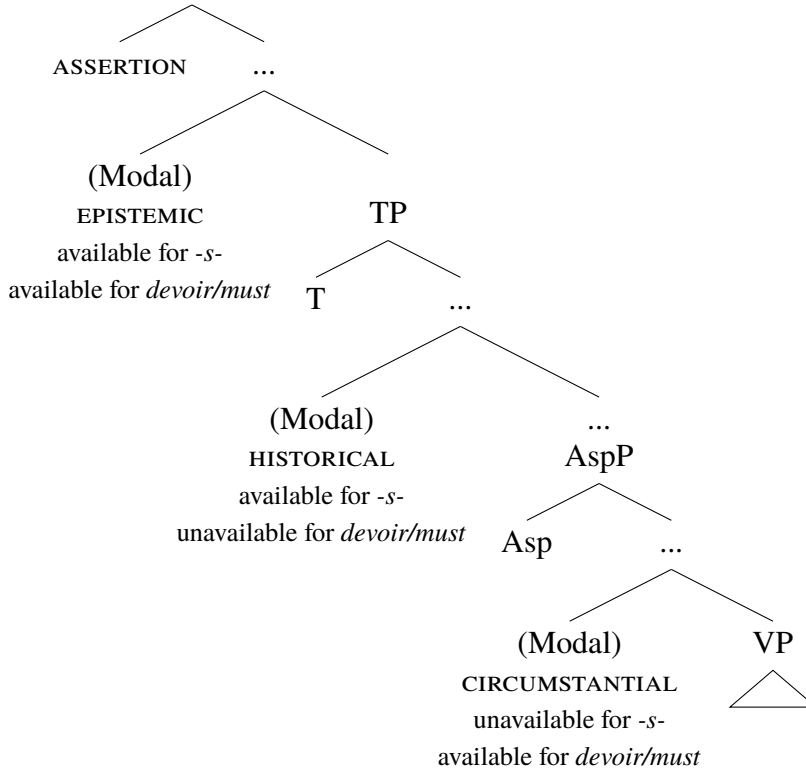
Thus, in adapting Hacquard's proposal for Gujarati, these differences between Gujarati *-s-*, and French *devoir* (and English *must*) have to be accounted for.

One way to get a handle on the problem is to say, as suggested above, that *-s-* takes a historical modal base in its low position, rather than a circumstantial one like *devoir/must*.

One way to cash this out is by allowing not just two positions as Hacquard does, but three. This third position for modals – between T and Asp – would make available a non-epistemic but non-circumstantial modal base (a historical modal base). A similar, type-driven suggestion is made by Kush (2011). for the situation in Hindi. This position would be associated with . Thus language-particular, syntactic factors may be relevant in constraining where a modal may occur.

The overall clausal structure proposed is as in (30):

(30)



In the future reading in Gujarati, a plausible configuration is as in (31):

(31) [TP ... -s- [AspP PROSP [VP ...]]

As suggested in Rullmann and Matthewson (2018), languages – Gujarati included – may allow a phonologically-null forward-shifting prospective aspect. Being phonologically null, it does not block the affixation of V to -s-, and so does not trigger Aux-support.

A denotation in the T/Asp-medial position for the whole clause might be as follows:

(32) $\llbracket \text{Gujarat Titans jiit-s-e} \rrbracket = \llbracket \text{Gujarat Titans win-S-AGR} \rrbracket =$

$\forall w' [w' \text{ is compatible with the history of } w :$
 $\exists e' [The \textit{Gujarat Titans win}(e, w') \wedge \tau(e) > t*]$

In all the worlds compatible with the word's history, there is an event of the Gujarat Titans winning which takes place at a later time than the reference time.

However, for this to be a full account, the compositional semantics would need to be developed beyond what has been achieved in this paper. Ideally, this could be achieved in the Kratzerian spirit followed in this paper, where the modal maintains a single lexical entry. But there may be issues. Assuming that Aspect takes a property of events and returns a property of times, we would need -s- to be flexible in type $\langle st, st \rangle$ when it composes with a clause (in its epistemic reading), and $\langle \langle i, st \rangle, \langle i, st \rangle \rangle$ for when it composes with AspP (in its future reading). For routes towards possible implementations, see Kush (2011) or Ramchand (2018).

5. Conclusion

This paper has argued that the following descriptive generalization holds in Gujarati: when the inflectional morpheme *-s-* is affixed to an auxiliary verb, it is read as an epistemic necessity modal, and when it is affixed to a main verb, it is read as a future-marker. I offered an analysis which assimilates this to the more general phenomenon of variable-flavor modality, while tying it to the height-relative determination of modal flavor (Cinque, 1999; Hacquard, 2006, 2010; Kratzer, 2012). *-s-* was treated as univocal, with the differences in meaning stemming in part from differences in syntactic position.

This, if right, places pressure on a view I noted at the outset of this paper; namely, the view which holds that talk about the future is a special kind of epistemic talk. It is true that we must make inferences under uncertainty to make sincere claims about the future. But this is the case in many kinds of sentences. Much evidence-based inference is involved in, say, talk of other people's mental states. But that does not mean attitude reports are themselves imbued with epistemic modality. In general, a sentence's truth being uncertain does not imply epistemic modality in the sentence's logical form, or even truth-conditions involving evidence. The data presented above strengthens this argument: not only *can* we treat talk about the future as distinct from epistemic talk, we ought to. The former does not require the special licensing that epistemic modals require, grammatically speaking.

Finally, the scope-taking behavior of *-s-* is also interesting to note again. It has been observed that *will* is *scopeless* (see e.g. Cariani and Santorio 2018; Cariani 2021).

- (33) a. It will not rain.
b. It is not the case that it will rain.

These sentences are synonymous, suggesting that *will* does not take scope with respect to negation. But in §3.2, we saw that Gujarati *-s-* *does* scope wrt. negation, even in its future use:

- (15) a. Varsaad nai pad-s-e, #(pan pad-i sak-e)
rain NEG fall-S-3 but fall-LINK can-PRES.3
'It won't rain, (#though it could).' □ » ¬
- b. Ev-u nathi ke varsaad pad-s-e, (pan pad-i sak-e)
that-GEN NEG.be.PRES that rain fall-S-3 but fall-LINK can-PRES.3
'It isn't that it must rain in the future (though it could).' ¬ » □

In the use of (15b), the speaker leaves it open whether or not it will rain, unlike (33b), which precludes the possibility of rain. Suppose that Cariani and Santorio are right that English *will* behaves as if it does not take scope because it picks out a single possible future world, like a definite description. How does a learner determine whether their language has a referential future like English, or a quantificational future like Gujarati? Are there seemingly independent properties of the language which determine how future claims are made?

This question, along with more detailed comparison of alternative implementations and accounts, would be important in a full account of the relation between epistemic modality and future tense. This paper has not gone so far. It has argued only that a framework which relates modal flavor to syntactic height, such as the height-relative framework, can continue to play an important role in answering such questions. The rest, I must leave to future work.

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