Factivity and prosody in Turkish attitude reports

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Contents

1. The stage

In this paper, I describe a hitherto unnoticed phenomenon in the intonation of Turkish attitude reports, where, in out of the blue, broad focus utterances, the availability of the factive inference shifts the sentence's prosodic nucleus from its default embedded clause internal position on to the matrix verb.

This is illustrated by the pair in 1, where caps indicates the position of the nucleus. The attitude report in 1a is non-factive. When uttered out of the blue, the direct object of the embedded clause is felt to be the most prominent word in the sentence. The attitude report in 1b, on the other hand, is factive: It presupposes the truth of the embedded proposition. When uttered out of the blue, it is the matrix verb that is the most prominent word in the sentence.

(1) What's up?

a. Dilara [Aybike'nin SIGARA ictigini] dusunuyor.
D. A. cigarette smoke thinks
Dilara thinks that Aybike smokes cigarettes.
(No factive inference. Nucleus in default embedded position.)

b. Dilara [Aybike'nin sigara ictigini] BILIYOR.
D. A. cigarette smoke knows
Dilara knows that Aybike smokes cigarettes.
(Factive inference: Aybike smokes. Nucleus shifts to the matrix verb.)

This is surprising. Why should availability of the factive inference affect prosodic structure? A very natural hypothesis[1] to formulate in light of the contrast in 1 is that presupposing the embedded clause, in 1b, gives the embedded clause a special 'information structural' status. A good candidate for that is that the embedded clause is marked as discourse-given. This, in turn, has an effect on the sentence's prosodic structure. Namely, the location of the nucleus is shifted away from the embedded clause and falls on an alternative position, the matrix verb. Despite some evidence in favor of such an account [Kallulli, 2006], many authors warn against the existence of an inferential step from presupposed to given [Wagner, 2012, Rochemont, 2016, Büring, 2016].

In this paper, I present an alternative hypothesis as to why the contrast in 1 might be observed. This is the 'syntax to prosody' hypothesis—where the effect of presupposition on prosodic structure is mediated by the syntax. I compare 'syntax to prosody' to a proposal like Kallulli's, which I name 'presupposed to given.'

1. **Hypothesis #1: Syntax to prosody**:
It might be that the syntax of factive attitude reports is different from that of non-factives in such a way that this results in a distinct syntax-to-prosody mapping.

[1] Throught this paper, we will see evidence that the phenomenon cannot be explained by appealing to the hypothesis that certain attitude verbs are lexically specified for stress, which is also an idea that one might have looking at 1.

2. **Hypothesis #2: Presupposed to given**: Adapted from Kallulli [2006]
   Alternatively, and independent of the syntax, it might be that presupposing the embedded proposition does make the embedded clause given. Given material is known to usually be deaccented (unless contrastive). This, as the hypothesis goes, has the effect of shifting the nucleus away from the embedded clause.

As the validity of an inferential step from 'presupposed to given' is debated in the literature, a serious defense of Hypothesis #2 will have to introduce the possibility that the realization of givenness varies across languages, or it will have to lead to a re-evaluation of the data proposed by Wagner and others that argue in favor of the independence of presupposition and givenness.

This paper is structured as follows. In section 2, I provide bakground information about the general prosodic organization of Turkish sentences. In section 3, I provide a description the core contrast seen in 1. In section 3.1, I focus on the main puzzle that the contrast raises, that is, that presupposition seems to condition prosodic structure. Section 3.2 is dedicated to a phenomenon called the 'prosodic factivity alternation.' For some attitude reports, the same string is judged to be factive or not depending on the position of the nucleus. Compare for example 1b, with matrix verb NPA, to 2. Here, the attitude report is judged as *non-factive*.

(2) Dilara [Aybike'nin SIGARA ictigini] biliyor.
D. A. cigarette smoke knows
Dilara believes that Aybike smokes cigarettes.
(No factive inference. Nucleus is on embedded object.)

The prosodic factivity alternation is an effect of the fact that presupposition conditions prosodic structure. And this is what I argue. The reason for spending time on the contrast between 1b and 2 is that similar contrasts are, to my knowledge, not described in the literature, and they inform the way that the factive inference should be modeled. In particular, simple accounts that encode the inference in the semantics of the attitude verb or in the semantics of embedded clauses are not satisfactory. After providing, in section 3.2.3, data that establishes the claim that the prosodic structure of attitude reports varies as a factor of their factivity, I provide, in section 4, a semantic account of the prosodic factivity alternation. In the present implementation, this involves associating factive attitude reports with a different syntactic structure than non-factives.

With the syntax, the semantics and the prosodic facts at hand, section 5 discusses evidence in favor of and against the two hypotheses presented above. And section 6 concludes.

2. The prosodic organization of a Turkish sentence

2.1. Default and marked sentential stress in monoclausal declaratives

2.1.1. Default

Usally, in utterances of sentences, there is a position of most prominence. This is usually a syllable or a word. If someone asks me something like "What's Dilara up to right now?" and I answer 3, the position of most prominence is the syllable 'ga,' on the word 'sigara.' I indicate this in the examples by using capital letters. A similar point holds for English, which can be seen, for example, in the translation.

(3) dilara siGAra içiyor
Dilara cigarette smokes
Dilara's smoking CIgarettes.

What is special about the syllable 'ga' is that it is the word's stressed syllable. This fine grained a representation will not be necessary in this paper. So I will talk about words, rather than syllables, as being prominent or not.

The word 'sigara,' in a sentence like 3 bears the sentence's 'main sentential stress,' 'nuclear pitch accent,' or is the sentence's 'nucleus.' At some level of representation, these terms refer to the same thing.[2] The word 'sigara' is the most prominent word in the sentence. A native speaker or even a non-native listener will feel this. But what is behind this feeling of prominence is far from being uniform across languages, across speakers of the same language, or, for that matter, clear at all. This will become apparent when looking at acoustic data in some of the subsequent sections.

What matters here is that the position of most prominence, which I will henceforth refer to as the position of the nucleus, or, interchangeably, the position of the NPA, has a default. This default is elicited when an utterance is placed in an all new, broad focus context. For example, if someone asks me something like "What's up?" I can answer 4a or 4b (among many other things).[3]

(4) What's up?
   a. ali SİGARA içiyor
   ali cigarette smokes
   Ali smokes/is smoking cigarettes.
   b. SU kaynıyor
   water boils
   The water is boiling.

In these cases, the nucleus is the direct object in 4a, and the subject in 4b. It is usually the case that objects in transitive sentences bear the NPA, and subjects in unaccusatives. The NPA might fall on other positions in other syntactic frames.

A note on terminology before proceeding. Sentences are assumed to be uttered against a background of alternatives. These are roughly things that the speaker could have said instead. When I say that an utterance is 'broad focus,' I mean that the alternatives are alternative propositions of any form. For example "I'm awfully late in turning in this draft" is a broad focus alternative to the sentences in 4. By contrast, "Ali smokes WEED" is a narrow focus alternative to 4a, or "MILK is boiling" is a narrow focus alternative to 4b.

[2]Talking about a nuclear *pitch accent* is shorthand and might be perceived as misleading, as the nucleus of the sentence is also marked by a difference in prosodic *phrasing*, that is, by edge tones as well. In some languages, loudness and duration might also be the acoustic correlates of stress. I have not looked into this for Turkish.

[3]Wagner [2012], at least, points out that in some cases, more sophisticated tests might be required to diagnose broad focus. Namely, in case we want to know whether a sentence where the NPA is in a non-canonical position can be uttered with broad focus. The test involves placing an exclusive particle like 'only' in the structure and checking what kinds of alternatives are excluded. This is not necessary here as the data in 4 are not controversial and the contrast between 4 and 5 is enough to show that the former can have broad focus out of the blue, but not the latter.

By an 'all new' or 'out of the blue' utterance, I mean that the linguistic expressions in the utterance have not previously been mentioned in the discourse, or that the things that they denote are not contextually salient, that is, salient in the surroundings or the mind of the conversation participants. An 'all new' or 'out of the blue context' is a context that elicits such utterances. These two notions are related, but not the same. See Wagner [2012], among others.

2.1.2. 'Marked'

When the NPA is shifted away from its canonical position the resulting sentences are marked out of the blue. In 5, the NPA is positioned on the matrix verb. Neither 5a nor 5b are felicitous answers to the broad focus question "What's up?":

(5) What's up?

a. # ali sigara İÇİYOR
Ali cigarette smokes
Intended: Ali smokes cigarettes. (broad focus intended)

b. # su KAYNIYOR
water boils
Intended: The water is boiling. (broad focus intended)

On the other hand, these sentences are good answers to questions like "What does Ali do with cigarettes?" (he SMOKES them) and "What is happening to the water?" (it is BOILING) where there is narrow focus on the predicate, or to "Is it the case that Ali smokes/is smoking cigarettes?" and "Is it the case that the water is boiling?" where there is polarity focus on the proposition.[4]

Because utterances like 5 are licensed in particular discourse contexts, they impose restrictions on the context when they are uttered out of the blue. This can lead to infelicity or can serve to trigger pragmatic effects. For instance, 5a gives rise to the inference that we have previously discussed whether Ali smokes or not, 5b to the inference that we have discussed whether the water is boiling or not. This is a phenomenon that I will refer to as 'givenness accommodation,' following Rochemont [2016].[5] By placing the NPA on the matrix verb, the speaker is proposing to treat the rest of the sentence material as given. This leads the hearer to accommodate a context that licenses this. And examples of such contexts are ones where the truth of the proposition was once a topic of conversation. Of course, if no such conversation has happened, the hearer might react: "Wait, did we talk about this before?"

2.2. Phonetics and phonology

In this section, I describe the phonetics and phonology of Turkish intonation in monoclausal declaratives.

[4]These questions are be compatible with alternative pragmatic contexts, indicated by focus. "Is it the case that ALI smokes cigarettes?" should elicit narrow focus on the subject, for example.

[5]Rochemont uses this term for examples like "John called Mary a Republican. And then SHE insulted HIM." Deaccenting the predicate in the continuation amounts to trating it as discourse given and gives rise to the inference that calling someone a Republican amounts to insulting them.

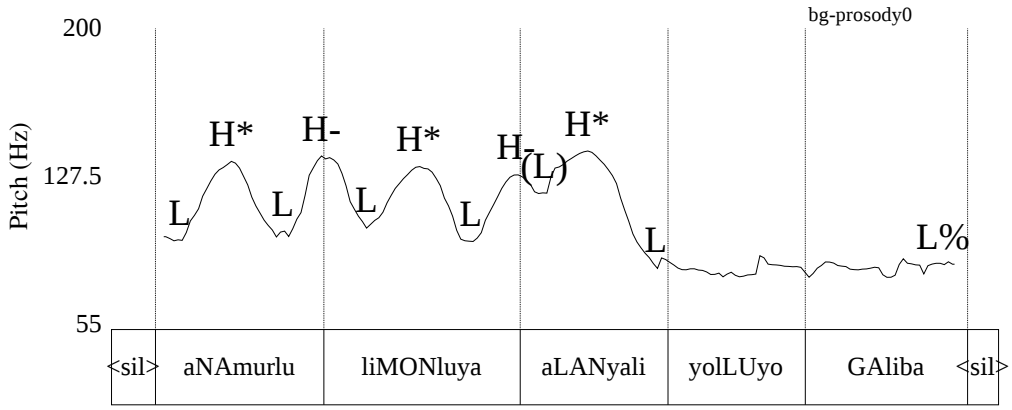
2.2.1. An ideal

Example 6 provides a transitive sentence annotated with prosodic information and a corresponding pitch track. The sentence was elicited by and from the author (M, 27) in an out of the blue context using careful (but not unnatural) enunciation. The position of stressed syllables is indicated by an acute accent.[6]

(6) (What's going on?)

a. anámurlu limónluya alányali yollúyor gáliba
(( )$_\Phi$ ( )$_\Phi$ ( )$_\Phi$)$_I$
Anamur.DEM Limonlu.DAT Alanya.DEM send ADV
The person from Anamur is sending people from Alanya to Limonlu, I think.

b. Pitch track for 6a



Prosodic units In Turkish, prosodic words carry a H(igh)* pitch accent aligned with their stressed syllable. On the pitch track in 6, we can identify three pitch accents. These are the high tonal targets aligned with the stressed syllables of the first three lexical words (the subject *anámurlu*, the directional *limónluya* and the direct object *alányali*). The third word, the nucleus, is not followed by further pitch accents and intermediate phrase boundaries. That is, there are two lexical words which do not seem to carry a pitch accent (the verb *yollúyor* and the adverb *gáliba*). We will return to these in a moment.

The first two lexical words have an additional high tone aligned with their right edge. These tones, noted H-, mark the right edge of a unit of prosodic structure that dominates the prosodic word. It is standardly assumed that this unit is the intermediate phrase. The first two lexical words, then, map onto two distinct prosodic words, which map onto two distinct intermediate phrases.[7] The intonational phrase is the third and final level of prosodic struc-

[6] I use place names in much of this material because it is easy to find many which consist of sonorants only and have non-final stress [Sezer, 1981]. The suffix *-lI*, glossed as DEM, derives demonyms from place names.

[7] One can show that the H* pitch accent is aligned with a word's stressed syllable, and that the H- edge tone tracks the right edge of phrases larger than the prosodic word. One might ask how we know what the stressed syllable of a word is. The answer is, in part, by looking at where the pitch accent is.

The typical Turkish word is described as having final stress, with stress remaining final as suffixes are attached. There are also words with non-final stress [Sezer, 1981]. Non-final stress is thought to be lexically represented. It is, to the best of my knowledge, still a matter of debate whether final stress is also lexically rep-

ture that there is evidence for in 6. It comprises here of the entire utterance. In declaratives, its right edge is marked with a low tone, noted L%.[8]

The H* and H- targets in 6 are surrounded by L targets. The status of these targets is, to the best of my knowledge, debated. It is possible to entertain the hypothesis that the pitch accents or the edge tones are, in fact, bitonal (or that they have a bitonal allotone). For example, we could assume following İpek [2015] that intermediate phrase boundaries are realized as LH-. This is consistent with what is observed in 6, but leaves two L tones unexplained: The sentence initial one, and the one located at the left edge of the third lexical word *alanyali*. To account for these, İpek argues that prosodic words are marked at their left edge with a L tone as well. (For alternative analyses, see Kan [2009], Kamali [2011], and İpek [2015] for discussion.) This, however, cannot uniformly be assumed to be the case as prosodic words with initial stress come with a H* pitch accent but no L left edge tone. My goal in this paper is not to settle this analytical issue, so I must leave the discussion here.

Elements of a syntax to prosody mapping For a comprehensive account of the syntax prosody mapping with an emphasis on modeling Turkish, the reader is invited to consult Güneş [2015]. I am only able to offer cursory remarks here.

Pre-nuclear intermediate phrases The left and right edges of pre-nuclear intermediate phrases are thought to align with the left and right edges of certain syntactic constituents [İpek and Jun, 2013]. This is not visible (or trivially true) in 6, where the pre-nuclear items are single prosodic words. Example 7 provides a more interesting illustration. which minimally differs from 6 in that the subject is now a possessive phrase. The possessive phrase includes two lexical, and corresponding prosodic words.

(7) [anámurlunun ananesi] limónluya alányali yollúyor gáliba
( ) ( ) ( )
*( ) ( ) ( ) ( )
anamurlunun ananesi limonluya alanyali yolluyor galiba
Anamur.DEM's grandma Lim.DAT Al.DEM send ADV
The person from Anamur's grandmother is sending people from Alanya to Limonlu, I think.

A natural way of phrasing the sentence in 7 is to wrap both prosodic words in the possessive phrase in an intermediate phrase. Although there might be alternative ways of phrasing 7, it is awkward to place an intermediate phrase break between the possessor and the possessum—unless the possessum is the nucleus (see below). This suggests that that in

resented (Ipek, Ipek & Jun), or whether finally stressed words are in fact unstressed (Kamali, Fery). According to the second view, the final high target on intermediate phrase final, finally stressed words is an H- boundary tone. According to the first, a bitonal H*+H-. This debate does not concern us here.

One way of checking this would be to construct sentences like *annénin arabasi...* vs. *menemenín arabasi...* ("grandmother's car..." vs. "the omelet's car...") where the position of the stressed syllable in the possessor is varied (non-final, final), in an environment that does not easily license an intermediate phrase break (within the possessive phrase). If a high tone is observed at the right edge of a possessor with final stress, it is likely then a pitch accent, rather than a boundary tone.

[8]Coordinated declaratives have a H% at the right edge of all but the final conjunct. *Wh-* questions end in a H%, and polar questions in a L% [Güneş, 2015, İpek, 2015].

some cases at least, the mapping is 'rigid': In the pre-nuclear field, syntactic constituents of a certain size must be parsed as intermediate phrases.

In Turkish, attitude reports typically feature embedding clausal constituents with the same surface morphosyntax as possessive phrases. It is then worth asking whether embedded clauses are mapped onto prosodic constituents in the same way the possessive phrase is in 7. We will see in the next sections that in certain attitude reports, the NPA tends to fall on a constituent within the embedded clause. In such cases, the embedded clause is not parsed as an ip.

(8) (anamurlu) [(ananenin limonluya) (ALANYALI yolladigini]$_{CP}$ dusunuyor)
An.DEM grandma Lim.DAT Al.DEM send.NMZ thinks
The person from Anamur thinks that the grandmother sent people from Alanya to Limonlu.

But the NPA need not fall within the embedded clause. In other attitude reports, it falls on the matrix verb. In those cases the embedded clause is pre-nuclear, and we expect it to be parsed as an intermediate phrase—given what we have seen in 7. This is illustrated in 9.

(9) (anamurlu) [(ananenin limonluya alanyali yolladigini)]$_{CP}$ (BILIYOR)
An.DEM grandma Lim.DAT Al.DEM send.NMZ knows
The person from Anamur knows that the grandmother sent people from Alanya to Limonlu.

This is a pattern that we observe in production studies (see section 3.2.3). However, there is variability. Although 9 is a possible prosodic parse of the sentence, some speakers do not reliably realize the expected ip break between the matrix subject and the embedded clause, or insert additional ip boundaries within the embedded clause. This suggests that further research is required on the topic of how pre-nuclear syntactic units are mapped onto prosodic ones.

The post-nuclear field It is an open question, I believe, whether pitch movements in the post-nuclear field are so compressed that they are not easily perceived or detected on a pitch track, or whether they are absent altogether.[9] This raises the question of how to organize the nucleus and the post-nuclear field within the prosodic hierarchy. What seems to be standardly assumed [Güneş, 2015] is the following. The nucleus maps onto one prosodic word, and the entirety of the post-nuclear field onto another (despite the potential presence there of many lexical words). The two prosodic words thus formed map onto an intermediate phrase. The expected H- boundary does not surface because, presumably, it coincides with the intonational phrase's L% boundary, which 'takes precedence.' This line of analysis, however, seems to allow for prosodic words that are not accented (assuming that post-nuclear material is not accented), and, arguably not headed. We might as well entertain the hypothesis that the nucleus and the post-nuclear field form one big prosodic word. This would solve the headedness issue. (Or, alternatively, that there might be multiple prosodic words in the post-nuclear field, instead of one.)

The verb is the final constituent in a sentence that is eligible to be the nucleus. Constituents can almost freely be moved past the verb in Turkish, but these constituents are

[9] Microprosody. Liquids?

then necessarily in the post-nuclear field, then deaccented and dephrased.[10]

Given this uncertainty with respect to the prosodic organization of the post-nuclear field, it is also unclear whether or how syntactic constituency within the post-nuclear field maps onto prosodic constituency. It should suffice to note that many constituents may occur in the post-nuclear field that do not obviously form a constituent that excludes other sentential material. This can be illustrated by 6, repeated below. The question is, what is its syntactic bracketing? The bracketing in 10a illustrates a hypothetical structure where there is a syntactic constituent that contains the DO, the V and the ADV, while excluding the dative and the subject. This involves keeping the adverb low, or, if the adverb is high, moving the subject and the dative leftwards to even higher positions. The hypothetical structure in 10b is one where there is no such constituent. The sentence final adverb is attached high, and does not form a constituent with the VP.

(10) Anamurlu Limonluya ALANYALI yolluyor galiba.
Anamur.DEM Limonlu.DAT Alanya.DEM send ADV
The person from Anamur is sending people from Alanya to Limonlu, I think. (=6)

a. Option #1: There is a syntactic constituent that contains the DO, the V, and the ADV
[Anamurlu [Limonluya [Alanyali [yolluyor galiba]]]]

b. Option #2: There is not a syntactic constituent that contains the DO, the V, and the ADV
[[Anamurlu [Limonluya [Alanyali [yolluyor]]]] galiba]

Depending on the syntax we choose, what we have to say about the mapping to prosody will differ. I will not pursue the matter here as this discussion has the potential to lead us astray.

The nucleus The third lexical word in 6 is the sentence's nucleus (*alanyali*). It is preceded on the pitch track by an intermediate phrase break. Its pitch accent is realized, and followed by a low tone. The low tone is sustained until the end of the intonational phrase. That is, the nucleus is not followed by any pitch accent (H*), or any intermediate phrase edge tone (H-). It is immediately visible in 6 that the nucleus marks a transition in the sentence's prosodic structure, between the pre-nuclear field, which hosts material that is regularly accented and phrased, and the post-nuclear field, which hosts 'deaccented' and 'dephrased' material (at least in appearance).

The pre-nuclear intermediate phrase break In example 6, the pre-nuclear intermediate phrase break corresponds to 'natural' syntactic boundaries. The break corresponds to the right edge of the constituent that precedes the nucleus, and to the left edge of the VP. In the syntactic structure illustrated below, $\times$ marks the position of the pre-nuclear ip boundary.

(11) [anamurlu [[$_{\text{DP}}$ limonluya] $\times$ [$_{\text{VP}}$ alanyali$_{\text{nucl.}}$ yolluyor]]]

In this sense, it is not immediately clear whether the pre-nuclear ip break is a regular feature of prosodic constituents in the pre-nuclear field, or whether it is a property of the nucleus.

[10] Parentheticals and certain post-verbal clauses (introduced by *ki*, a complementizer, and *çünkü*, 'because') induce a pitch reset and are not deaccented and dephrased [Kan, 2009, Güneş, 2015].

That is, is it marking the right edge of the pre-nuclear DP, the left edge of the VP, or the left edge of the nucleus?

In cases cases where the nucleus falls on or within a constituent that is more complex than a single lexical word, the pre-nuclear ip boundary may break into that constituent. In the two sentences in 12 the direct object is respectively a possessive phrase and a nominalized complement clause. In the first case, the nucleus is the possessum, in the second, it is the embedded direct object. In both cases, the nucleus is preceded by a high boundary tone. This is the pre-nuclear intermediate phrase break and it seems to break into a syntactic constituent.

(12) a. limonluya [alanyalinin ANANESINI] yolladi
( )$_\Phi$ ( )$_\Phi$ ( )$_\Phi$
Lim.DAT Al.DEM.GEN grandma send
She sent the person from Alanya's grandmother to Limonlu.

b. anamurlu [ananenin LIMONLUYA gittigini] dusunuyor
( )$_\Phi$ ( )$_\Phi$ ( )$_\Phi$
An.DEM grandma Lim.DAT go.NMZ think
The person from Anamur thinks that the grandmother went to Limonlu.

It is possible, of course, that the possessor in 12a and the embedded subject in 12b have undergone string-vacuous movement, and vacated the possessive phrase or the embedded clause. (Independent evidence suggests that these phrases may overtly undergo such movement.)

(13) a. Possible syntactic structure for 12a
[Limonluya [Alanyalinin [___ ananesini yolladi]]]
( ) ( ) ( )

b. Possible syntactic structure for 12b
[Anamurlu [ananenin [[___ Limonluya gittigini] dusunuyor]]]
( ) ( ) ( )

With similar assumptions, a correspondence between the pre-nuclear intermediate phrase break and syntactic constituency may be maintained.

Although the nucleus is conveniently described as being the 'NPA bearer,' it is unclear whether the pitch accent itself has any special status.[11] At least two additional prosodic cues serve to bring the nucleus out in the prosodic organization of a sentence. The pre-nuclear phrase break and the post-nuclear fall, realized whenever linguistic material occurs in those fields. In fact, the nucleus's pitch accent is sometimes lower than the high targets preceding it, and realizes a plateau rather than a peak. (This is not visible in the pitch track for 6 above, but it is in some of the token utterances presented later.)[12] It is possible, in Turkish at least, that the tonal events surrounding the nucleus's pitch accent rather than the nuclear pitch accent itself (the preceding ip break and the following pitch compression) might contribute to making the nucleus the most prominent unit acoustically.

[11] Ipek labels this pitch accent differently from non-nuclear pitch accents. I do not know whether this is intended to imply that there is a categorical difference, or is simply a label.

[12] This observation is in line with the description of the nuclear pitch accent in, e.g., English: Despite being the perceptually most prominent prosodic unit in the sentence, the nucleus is not necessarily the most prominent unit acoustically (**citation**).

2.2.2. Elicitation studies

Part of the present project involved conducting production studies where monoclausal declaratives and attitude reports were elicited in different pragmatic contexts. In this section, the results of one study are presented, whose goal was to answer the following research questions:

1. What are the characteristic features of the prosodic structure of Turkish sentences in production? What forms of inter- and intra-speaker variation are found?
2. In particular, how is the nucleus realized?
3. What are some pragmatic factors that affect the position of the nucleus?
4. Does the position of the nucleus have an effect on its realization?

This study was designed to serve as a control for another study about the effect of pragmatic and semantic factors on the prosodic structure of attitude reports (section 3.2.3).

Materials and methods

Design Monoclausal declaratives were elicited in different pragmatic contexts, realized as *wh*- questions. Target utterances were the answers to those questions. In the questions, the position of the *wh*- word was manipulated. This was thought to have an effect on the position of the nucleus in the target declarative. The NPA was expected to align with the constituent corresponding to the *wh*- word.

A target monoclausal declarative is illustrated in 14a, elicited in the contexts in 14b. These contexts were designed to elicit narrow focus respectively on the subject, the possessor, the possessum,[13] and the verb.

(14) a. Target monoclausal declarative
Ereğlililer annanenin manolyalarını yoluyor galiba.
Eregli.DEM grandma's magnolias pluck ADV
The people of Eregli are plucking grandma's magnolias, I think.

b. Context types:
i. Who's plucking grandma's magnolias?
ii. Whose magnolias are the people of Eregli plucking?
iii. The people of Eregli were plucking grandma's what?
iv. What are the people of Eregli doing to grandma's magnolias?

All target utterances were of one of the forms in 15.

(15) a. 'Subject [Possessor Possessed]$_{\text{Direct Object}}$ Verb Adverb'
b. 'Object [Possessor Possessed]$_{\text{Subject}}$ Verb Adverb'

The first factor that was manipulated was pragmatic context, as shown in 14. The second factor was the order the subject and the object, either SO, or OS, as shown in 15.

[13] English does not straightforwardly allow questioning possessed nouns. '*What did John's ___ sell for $100?' This is not a problem in Turkish.

The design is summarized in 16.

(16) Design: Monoclausal declaratives

Factor 1 Word order	Factor 2 Focus position	Context
SOV	Subject	Kimler annanenin manolyalarını yoluyor? Who's plucking grandmothers magnolias?
	Pssr	Ereğlililer kimin manolyalarını yoluyor? Whose magnolias are the people of Ereğli plucking?
	Pssm	Ereğlililer annanenin nelerini yoluyor? The people of Ereğli are plucking grandmothers what?
	V	Ereğlililer annanenin manolyalarını n'apıyor? What are the people of Ereğli doing to grandmother's magnolias?
	Target sentence: Ereğlililer annanenin manolyalarını yoluyor galiba. The people from Ereğli are plucking grandmother's magnolias I think	
OSV	Subject	Kimi annanenin manolyalıları yoruyor? Who is grandmother's magnolias bothering?
	Pssr	Ereğliliyi kimin manolyalıları yoruyor? Whose magnolias are bothering the person from Ereğli?
	Pssm	Ereğliliyi annanenin nelerini yoruyor? Grandmother's what is bothering the person from Ereğli?
	V	Ereğliliyi annanenin manolyalıları n'apıyor? What are grandmother's magnolias doing to the person from Ereğli?
	Target sentence: Ereğliliyi annanenin manolyalıları yoruyor galiba. Grandmother's magnolias are bothering the person from Ereğli I think.	

Stimuli 32 items were used in this study—4 different lexicalizations for every combination of the focus position and the word order factors. The words in the target sentences contained sonorants only. The target sentences matched in the number of syllables.

(17) [e.reg.li.li.ler]$_S$ [an.na.ne.nin ma.nol.ya.la.ri.ni]$_{DO}$ [yo.lu.yor]$_V$ [ga.li.ba]$_{ADV}$
[e.reg.li.li.yi]$_{DO}$ [an.na.ne.nin ma.nol.ya.li.la.ri]$_S$ [yo.ru.yor]$_V$ [ga.li.ba]$_{ADV}$
5σ 4σ 6σ 3σ 3σ

The lexicalizations differed slightly across the two levels of the word order factor. The same adverb *galiba*, '≈ I think,' occurred post-verbally in all of the items. This was done to keep the verb from being utterance final, so that pitch movements could be observed on the verb without the interference of intonation phrase final phenomena.

Participants, equipment, and analysis Two participants took part in the study. Only the data from one was analyzed (F, 25, Standard Turkish spoken in Ankara, data collected on March 16 2017).

The participants were recorded using a Shure SM10A head-mounted microphone connected to a Zoom H5 recorder. The experimental materials were presented one by one on

slides on a personal computer. The order in which the items were presented was randomized.

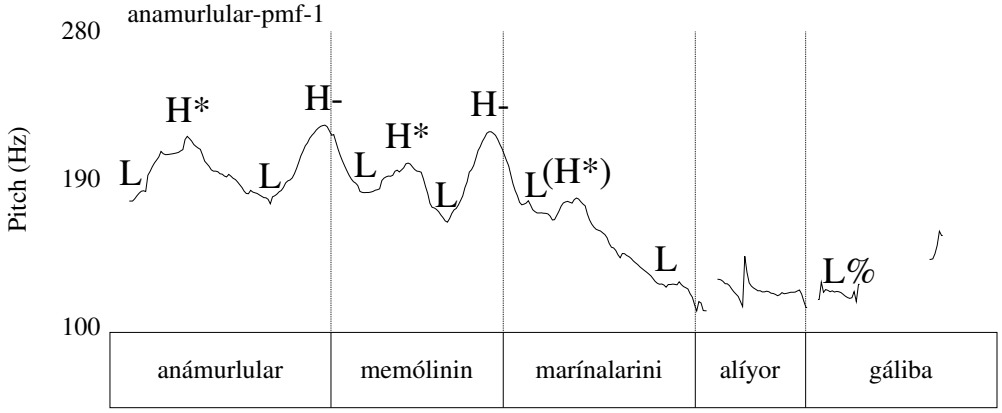
The recordings were segmented, annotated, and graphed with Praat [Boersma and Weenink, 2012]. The conclusions drawn are based on visual inspection of sentences' spectrograms and pitch contours.

Results Overall, the position of the nucleus in the target utterances tracked the position of the *wh-* word in the question. Word order did not have an additional effect on the position of the nucleus. Across conditions, the structure illustrated in 6 largely held. That is, pre-nuclear syntactic constituents (when available) mapped onto intermediate phrases, the nucleus was preceded by an intermediate phrase break and followed by a sustained low tone. Visual inspection of the pitch tracks did not reveal any obvious effect of the position of the nucleus on its realization. Some variability in the production of pre-nuclear pitch accents and phrasing was observed, which prompts the need for further investigation.

The following pitch track is representative of the results, and belongs to an item elicited in the SOV×Possessed focus condition.

(18) a. ((anámurlular)$_\Phi$ (memólinin)$_\Phi$ (marínalarini alíyor gáliba)$_\Phi$)$_\mathrm{I}$
anamur.DEM memoli's marinas buy ADV
The people of Anamur are buying Memoli's marinas, I think.

b. Pitch track for 18a

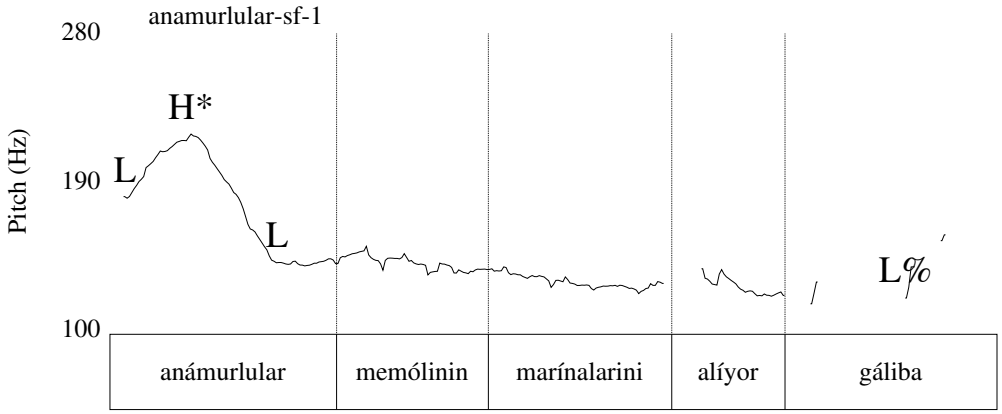


We observe three H* pitch accents, aligned with the subject, the possessor and the possessum's stressed syllables. The subject and the possessor are marked at their right edge, by an H- intermediate phrase boundary. This suggests that they map onto two intermediate phrases. The nucleus is the possessum, which aligns with the position of the *wh-* word from the prompt. The nucleus's pitch accent is followed by a low target, sustained until the end of the utterance.

When the position of the *wh-* word is manipulated, the position of the nucleus aligns with it in the target utterance. The following pitch track belongs to an item with the same lexicalization as 18a, elicited in the SOV× Subject focus condition. The nucleus is the subject.

(19) a. ((anámurlular memólinin marínalarini alíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
anamur.DEM memoli's marinas buy ADV
The people of Anamur are buying Memoli's marinas, I think.

b. Pitch track for 19a

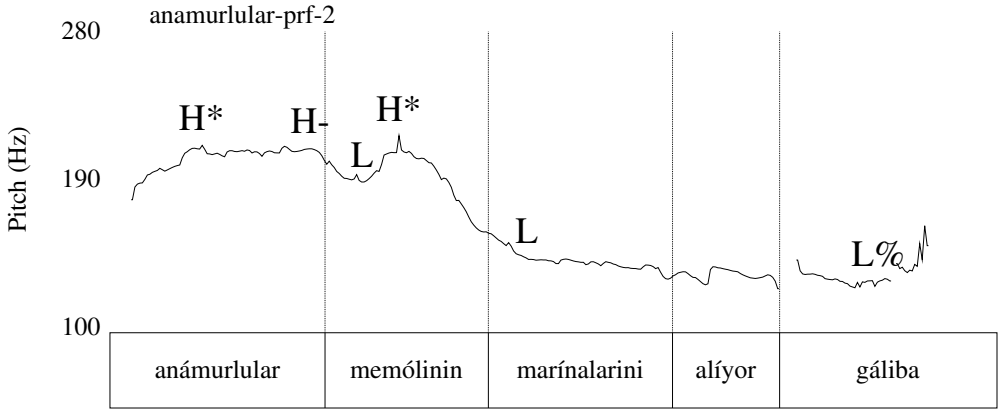


Because the nucleus is sentence initial, prosodic phenomena associated with the pre-nuclear field are not observed. The subject's pitch accent is realized and followed by a sustained low.

The following pitch track belongs to the corresponding item elicited in the SOV×Possessor focus condition.

(20) a. ((anámurlular)$_{\Phi}$ (memólinin marínalarini alíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
anamur.DEM memoli's marinas buy ADV
The people of Anamur are buying Memoli's marinas, I think.

b. Pitch track for 20a

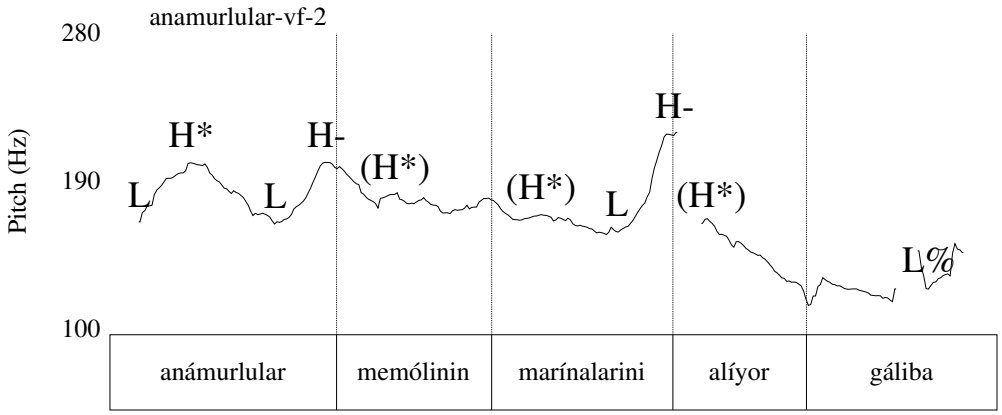


This is where it becomes interesting to note that DE displays some variability in the accenting and phrasing of pre-nuclear material. The subject's H* pitch accent and an H- intermediate phrase break do seem to be observed. Note that in the absence of the H-, we might have expected to observe a fall after the subject's pitch accent. However, the subject's pitch accent and the right edge of the intermediate phrase it maps onto are not separated by a low target. The nucleus is realized regularly by the possessor.

The following pitch track belong to the corresponding item elicited in the SOV×Verb focus condition.

(21) a. ((anámurlular)$_\Phi$ (memólinin marínalarini)$_\Phi$ (alíyor gáliba)$_\Phi$)$_I$
anamur.DEM memoli's marinas buy ADV
The people of Anamur are buying Memoli's marinas, I think.

b. Pitch track for 21a



Here, the subject is accented and phrased 'regularly.' However, the pitch accents on the possessive phrase vanish. We can tell, based on the distribution of the intermediate phrase boundaries, that the syntactic constituent formed by thepossessive phrase is mapped ont an intermediate phrase.

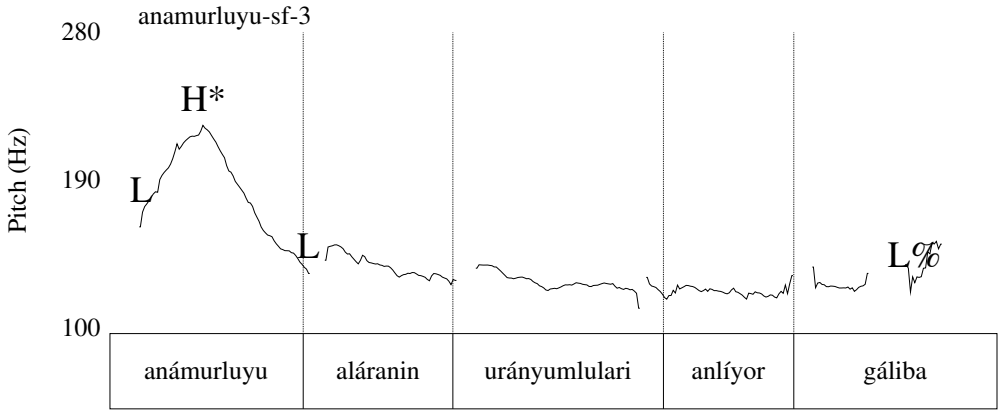
The prosodic structure of the utterances displayed above suggests that the position of the nucleus tracks the position of the *wh-* word in the prompt, and that it is systematically preceded by an intermediate phrase boundary and followed by a sustained low tone. There is some variability in the accenting and the phrasing of pre-nuclear material. We will see more of this in the examples that follow. I will be satisfied, for present purposes, to note locations where there is such variability, and leave the exploration of their source for further research.

For items where the word order was OSV, there did not seem to be a qualitative difference in the realization or in the position of the nucleus when compared with their SOV counterparts in the same focus condition.

Item 22 was elicited as an answer to a subject *wh*- question.

(22) a. ((anámurluyu aláranin urányumlulari anlíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
Alara's people with uranium understand the person from Anamur.

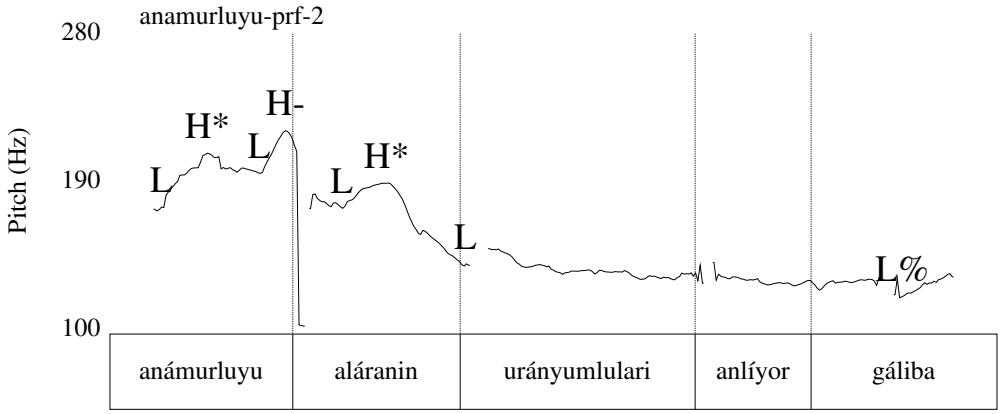
b. Pitch track for 22



Item 23 to a possessor *wh*- question.

(23) a. ((anámurluyu)$_{\Phi}$ (aláranin urányumlulari anlíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
Alara's people with uranium understand the person from Anamur.

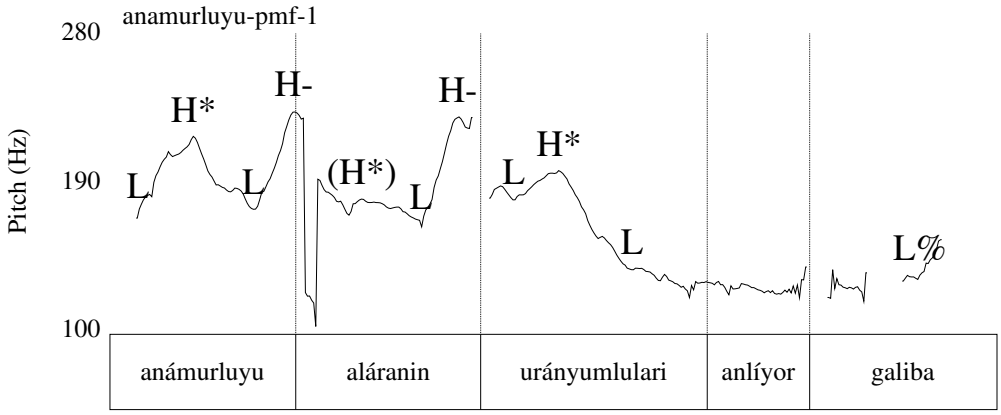
b. Pitch track for 23



Item 23, to a possessum *wh*- question.

(24) a. ((anámurluyu)$_{\Phi}$ (aláranin)$_{\Phi}$ (urányumlulari anlíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
Alara's people with uranium understand the person from Anamur.

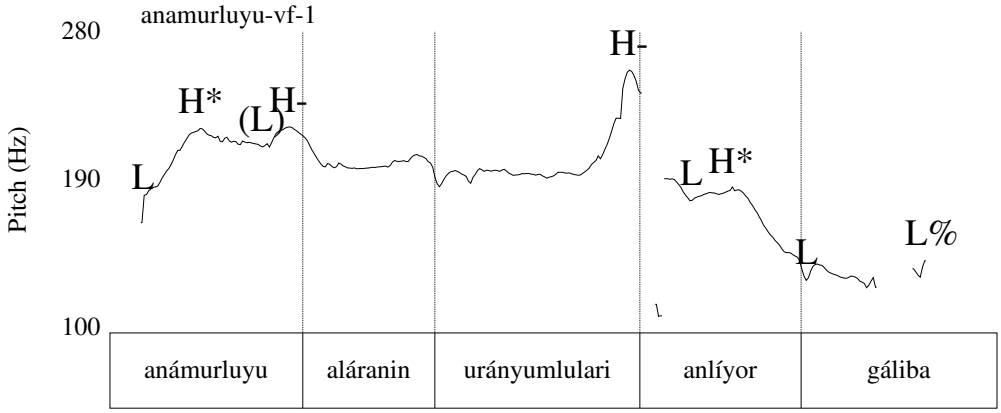
b. Pitch track for 24



And finally, item 25a, to a verb *wh*- question.

(25) a. ((anámurluyu)$_{\Phi}$ (aláranin urányumlulari)$_{\Phi}$ (anlíyor gáliba)$_{\Phi}$)$_{\mathrm{I}}$
Alara's people with uranium understand the person from Anamur.

b. Pitch track for 25a



2.3. Interim conclusion

In this section, I have described the prosodic structure of Turkish monoclausal declaratives.

3. Two puzzles: Factive presupposition and prosodic structure interact

3.1. The interaction between prosody and the factive inference

3.1.1. Default sentential stress in attitude reports

We have seen in section 2 that the NPA has a default position in out of the blue, broad focus utterances, and that deviations from that position (out of the blue) trigger contextual effects called 'givenness accommodation.'

This pattern of default vs. marked prosody carries over to multi-clausal sentences. (I will mostly be concerned here with attitude reports where clauses are embedded in object position.) In 26a and 26b, which are attitude reports introduced by the verb *düşün-* ('think'), the NPA falls within the attitude verb's complement. And within the complement, it falls on the direct object in a transitive embedded clause, and on the subject in an unaccusative one.

(26) What's up?

a. dilara [ali'nin SIGARA ictigini] dusunuyor
D. A. cigarette smoke think
Dilara thinks that Ali smokes cigarettes.[14]

b. dilara [SU kaynadigini] dusunuyor
D. water boils think
Dilara thinks that water's boiling.

This is the NPA's default position. And it is the same position that it would have fallen on, had these clauses occured unembedded.

Changing the position of the NPA within the embedded clause, or positioning it on the matrix verb results in interpretations that are marked out of the blue. In 27, for instance, the NPA is positioned on the embedded predicate.

(27) What's up?

a. # dilara [ali'nin sigara ICTIGINI] dusunuyor
D. A. cigarette smoke thinks
Intended: Dilara thinks that Ali smokes cigarettes. (broad focus intended)

b. # dilara [su KAYNADIGINI] dusunuyor
D. water boils think
Intended: Dilara thinks that water's boiling. (broad focus intended)

The resulting utterances are odd out of the blue. One inference that they give rise to is that we have previously discussed whether Ali smokes, or whether the water's boiling. Another, that is available, but perhaps less accessible, is the inference that the Ali smokes cigarettes as opposed to, say, selling them, or that water is boiling, as opposed to, say, freezing. This suggests that these utterances involve either polarity focus on the embedded proposition, or narrow focus on the embedded verb.

In 28, the NPA is positioned on the matrix verb.

(28) What's up?

[14] I am glossing over the fact that the embedded clause is compatible with both a habitual and a progressive interpretation.

a. # dilara [ali'nin sigara ictigini] DUSUNUYOR
D. A. cigarette smoke think
Intended: Dilara thinks that Ali smokes cigarettes. (broad focus intended)

b. # dilara [su kaynadigini] DUSUNUYOR
D. water boils think
Intended: Dilara thinks that the water's boiling. (broad focus intended)

The resulting utterances are also odd out of the blue. They give rise to inferences similar to the ones discussed for the previous pair: We have previously talked about whether Dilara thinks that Ali smokes, or whether she thinks that the water is boiling (matrix polarity focus). Or, Dilara thinks these things rather than, say, hoping them (narrow matrix verb focus).

In the two sets of sentences, we see that shifting the position of the NPA away from its default position makes the sentences incompatible with a broad focus interpretation out of the blue. When the NPA is on the embedded verb, the resulting interpretation is narrow focus on the embedded verb or polarity focus on the embedded proposition. When the NPA is on the matrix verb, the resulting interpretation is narrow focus on the matrix verb or polarity focus on the matrix proposition.

It is important to observe that attitude reports discussed in this section are introduced by *düşün-*, and are non-factive (and in fact, must be non-factive, see section 3.2.2). This allows us to formulate the following generalization, about the position of the NPA in non-factive attitude reports:

(29) **The non-factive attitude report NPA position generalization**
With non-factive attitude reports, the default position of the NPA is its default position in the embedded clause.
(E.g., on the direct object of transitives, or on the subject of unaccusatives, etc.)

3.1.2. A 'marked default': Sentential stress in factive attitude reports

In factive attitude reports,[15] a deviation is observed from the pattern illustrated in 26 and captured by the generalization in 29. These attitude reports can be uttered naturally out of the blue, with broad focus, with the NPA shifted away from its canonical position, on to the matrix verb.

Let us first look at 30. This attitude report is introduced by the verb *bil-*, which translates here as 'know.' Uttered in an utterance context that entails the truth of the embedded proposition, the NPA must be positioned on the matrix verb.

[15] I extend my thanks to Sarah Zobel and David Pesetsky for prompting me to think about what I mean by 'factive.' 'Know' is considered by all to be factive. 'Forget' is considered by some to be a factive [Hooper, 1975, Beaver, 2010] and by others to be an 'implicative' verb [Karttunen, 1971, 2016]. David Pesetsky objected to my claim that 'be aware' is a factive (`http://deniz.fr/pdfs/mitll.pdf`), citing examples where the predicate is negated and where the projection of the presupposition is not robust. But [Beaver, 2010, Karttunen, 2016, a.o.] do list the predicate under factives. 'Notice' and 'find out' are notorious for allowing novel presuppositions. The conclusion is that things are complicated. By 'factive' I will most often mean those attitude reports that entail or presuppose the truth of their embedded proposition *in root declaratives*. I am not immediately concerned with presupposition projection. All of these verbs, I believe, pass the test. I briefly deal with the issue of novel presuppositions in section 5.2.

(30) What's up?
dilara [ali'nin sigara ictigini] BILIYOR
D. A. cigarette smoke knows
Dilara knows that Ali smokes cigarettes. (broad, factive)

When the NPA is placed in its canonical embedded position, something strange happens. The sentence is no longer the intended broad focus utterance of a factive attitude report.

(31) What's up?

(#) dilara [ali'nin SIGARA ictigini] biliyor
D. A. cigarette smoke knows

a. Intended: Dilara knows that Ali smokes cigarettes. (broad, factive)
b. Available: Dilara believes that Ali smokes cigarettes. (broad, non-factive)
c. Available: Dilara knows that Ali smokes CIGARETTES.
As an answer to 'What does Dilara know that Ali smokes?'
(embedded narrow, factive or non-factive)

The most readily available interpretation for 31 is that of a non-factive belief report, given in 31b. If, on the other hand, a factive interpretation is kept constant, the interpretation is that of a factive knowledge report with narrow focus on the embedded proposition. This is reported in 31c. Various narrow focus options are available here, given that the NPA is positioned on the embedded direct object whence focus can 'project.' That is, 31, under its factive interpretation, is a good answer to questions like: "What does Dilara know? What does Dilara know that Ali does? What does Dilara know that Ali smokes?"

This pattern reveals three things. First, in its non-factive interpretation, the sentence conforms to the generalization about the position of the NPA in non-factive attitude reports, given in 29. Second, the attempt to keep a factive interpretation while the NPA is embedded results in a narrow focus interpretation. This strongly suggests that the 'default' accent pattern of these factives is one where the NPA falls on the matrix verb. Third, a natural explanation to why 30 has matrix focus could be that certain attitude predicates are lexically specified to be accented. The comparison with 31, however, precludes this option.

The existence of pairs like 31 and 30 is a puzzle in itself. This alternation, which I call the 'prosodic factivity alternation,' is the topic of section 4.

There are other attitude reports which have to have matrix NPA out of the blue but which do not participate in the alternation described above. This is illustrated in 32, with attitude reports introduced by *unut-*, 'forget.'

(32) What's up?

a. dilara [ali'nin sigara ictigini] UNUTTU
D. A. cigarette smoke forgot
Dilara forgot that Ali smokes cigarettes. (broad, factive)

b. # dilara [ali'nin SIGARA ictigini] unuttu
D. A. cigarette smoke forgot

i. Intended: Dilara forgot that Ali smokes cigarettes.
(broad, factive)

ii. Available: Dilara forgot that Ali smokes CIGARETTES.
As an answer to 'What did Dilara forget that Ali smokes?'
(embedded narrow, factive)

When the NPA is positioned in the embedded clause, with *unut-*, a non-factive interpretation is unavailable. What remains is that the embedded proposition must be under narrow focus.[16]

The data in this section allow us to formulate the following generalization, about the position of the NPA in factive attitude reports:

(33) **The factive attitude report NPA position generalizations** With factive attitude reports, the default position of the NPA is the matrix verb.

3.2. An illusion: The prosodic factivity alternation

3.2.1. A strict correlation between NPA position and FI?

In the previous section, we have seen that the factive presupposition seems to shift an attitude report's NPA away from the embedded clause. There are attitude reports in Turkish where factivity alternates. That is, the availability of the factive inference is conditioned by factors other than the choice of the attitude verb. Özyıldız [2017] shows that one such factor is the syntax of the embedded clause: While a factive reading is available in attitude reports introduced by *bil-* where the embedded clause is nominalized, when the embedded clause is tensed the attitude report is necessarily non-factive. (Such a pattern seems to be common across languages, [Moulton, 2009, Abrusán, 2011a, Hanink and Bochnak, 2017, a.o.].)

The data in 34 shows that even when the embedded clause is nominalized, factivity alternates. At first sight, the generalization seems to be that these attitude reports are factive if and only if the matrix verb hosts the NPA.

(34) Out of the blue

a. Dilara [Aybike'nin sigara ictigini] BILIYOR.
D. A. cigarette smoke.NMZ knows
Dilara knows that Aybike smokes. $\rightsquigarrow$ Aybike smokes.

b. Dilara [Aybike'nin SIGARA ictigini] biliyor.
D. A. cigarette smoke.NMZ knows
Dilara believes that Aybike smokes. $\not\rightsquigarrow$ Aybike smokes.

First, this contrast and the data seen in the previous section raise the question of the nature of the differences in prosodic structure that are revealed by intuition and that are reported here. In particular, is the difference between 34a and 34b a difference in the position of the sentence's nucleus? The answer, I will argue, is positive. But something else could have happened. There could have been an 'irregularity' in the prosodic structure of at least one of these attitude reports. This irregularity could have been the realization of a factive operator (which would explain the factivity of 34a), or the realization of a non-veridical operator (which would explain the non-factivity of 34b), etc. But this is not the case—the prosodic structure of these attitude reports is regular.

[16] There is a third type of exceptional accent pattern with factive attitude reports. To keep things manageable, I discuss that pattern in section 5.2.

The second question that contrasts like 34 raise is, how many semantic representations do attitude reports introduced by *bil-* embedding a nominalization map onto? If we assume that a non-factive meaning involves belief, and that a factive meaning involves belief conjoined with the truth of the embedded proposition, we have a situation where the interpretation of a single string is (claimed to be) ambiguous between a weak reading and a strong reading. In this situation, we can show that the weak reading is a reading. But we cannot show that the strong reading is a reading. This is because we cannot construct contexts in which the strong reading is true and the weak reading is false, as the strong reading entails the weak reading. This leaves us with the following two analytical options.

(35) a. Option #1
'S *bil-* p' uniformly maps onto a non-factive semantic representation, which is compatible with the truth of the embedded proposition.

b. Option #2
'S *bil-* p' maps onto a non-factive semantic representation under some set of circumstances, and onto a factive semantic representation under another.

I argue that we need to choose Option #2. Attitude reports introduced by *bil-* are 'ambiguous' between a factive semantics and a non-factive one. These two representations differ 'only' in the presence of a factive entailment/presupposition in the former.

Once we have made these two points, we can move onto a compositional implementation of the factivity alternation, and onto testing hypotheses about how the availability of a factive inference in the semantics should interact with prosodic structure.

3.2.2. Evidence for the readings

In this section, I provide evidence that attitude reports introduced by *bil-* alternate between a factive reading and a non-factive one. Implicit in this claim is that the factive inference is a semantic inference, i.e., an entailment or a semantic presupposition.

Uncontextualized judgment The first piece of evidence comes from the observation that uncontextualized utterances of attitude reports like 34a are judged to be factive, while uncontextualized utterances of 34b are not. I have reported my own native intuition above.

A pilot judgment task ran in June 2017 (n=38) involved the auditory presentation of the two sentences in 36 in two conditions. Either the matrix verb had the NPA, or the NPA was in its default embedded position. I indicate this in the examples below by means of a subscript (F), for 'Focus.'

(36) a. Merve ogretmeninin Paris'te$_{(F)}$ yasamis oldugunu biliyor$_{(F)}$.
Merve her.teacher in.Paris live be know
Merve {knows, believes} that her teacher has lived in Paris.

i. Factive response:
Ogretmen Paris'te yasamis.
The teacher lived in Paris.

ii. Non-factive response:
Ogretmen Paris'te yasamamis olabilir.
The teacher might not have lived in Paris.

b. Recep referandumu yuzde yuzle$_{(F)}$ kazandigini biliyor$_{(F)}$.
Recep referandum 100 100.with win know
Recep {knows, believes} that he won the referandum with 100%.

i. Factive response:
Referandumu yuzde yuzle kazanmis.
He won the referandum with 100%.

ii. Non-factive response:
Referandumu yuzde yuzle kazanmamis olabilir.
He might not have won the referandum with 100%.

One group of participants saw 36a in the 'factive condition,' and 36b in the 'non-factive condition.' The situation was reversed for a second group of participants. For each sentence, participants were asked whether they felt that in the situation described by the target sentence, the embedded proposition was true—that is, they had to pick between 36a-i and 36a-ii, and between 36b-i and 36b-ii. The response pattern was that, overall, 97% of the responses to a sentence in the factive condition were factive, vs. 66% of responses in the non-factive condition. This response pattern suggests that native speakers are accessing a factive reading when the matrix verb has the NPA (almost) all of the time. This rate drops when the NPA is in an embedded position.[17]

A third source of related evidence comes from comments made by speaker DE during a production study which I report on in section 3.2.3. After reading the sentence in 37a with the NPA on the matrix verb, the speaker gives the paraphrase in 37b. The paraphrase reveals that the speaker is accessing a factive reading, as it includes the phrase *bunu biliyormus* ('know it'), rather than *öyle biliyormuş* (lit. 'know so'). Demonstrative proforms (e.g., *bu*, 'this') are typically used to refer back to propositions that are common ground, while the proform *öyle* ('so') is not.

(37) a. Romanyalilar Memolinin marinayi aramadigini biliyor galiba.
R. M. marina look.for.NEG know ADV
The Romanians know that Memoli is not looking for the marina, I think.

b. "Memoli marinayi aramiyormus, ve Romanyalilar da bunu biliyormus."
"Memoli was apparently not looking for the marina, and the Romanians knew it." (I use "apparently" to translate a reportative evidential.)
[20170316-de-mv-focus, 258s.]

And after reading two versions of 38a, one with matrix NPA and the other with embedded, their comment is reported in 38b. In the first comment the non-factive attitude report with *bil-* is paraphrased by the verb *san-* which is always non-factive. In the second, the speaker is wording an anti-presupposition: The inference associated with certain non-factive attitude reports that the embedded proposition is false ('Mary thinks I have a sister' $\rightsquigarrow$ I don't have

[17] One might wonder why 66% rather than, say, chance. This might have something to do with other competing attitude reports. A competitor to **??** might be its counterpart introduced by *düşün-*, which does not have a factive reading, This might have an effect. Another factor might be the fact that the task simply asked about the truth of the embedded proposition, which might introduce a bias toward a 'true' answer. These hypotheses were not explicitly tested in the pilot.

a sister). Third the factive attitude report with *bil-* is paraphrased with the same verb *bil-*[18] and by asserting the embedded proposition.

(38) a. Ereglililer Yalova'nin uranyumu yolladigini biliyor galiba.
E. Y. uranium sent know ADV
The people of Eregli {know, believe} that Yalova has sent the uranium.

b. i. "[version with embedded NPA] desem yollayip yollamadigi muallak gibi olur, o zaman 'saniyor' gibi olur."
"If I say [the version with embedded NPA] it is unclear whether they sent it or not. Then, it is as if I had used 'believes' (*san-*)."

ii. Again after reading the embedded NPA version: "...ama yollamamislar, oyle saniyorlar."
"They didn't send it. They believe it."

iii. After reading the matrix NPA version: "...burda biliyolar, ve Yalova'da uranyumu yollamis yani."
"here, they know (*bil-*) it, and so Yalova has sent the uranium."
[20170316-de-mv-focus, 350s.]

These paraphrases clearly suggest that DE is accessing a factive reading, which they paraphrase as 'p and S knows it,' and a non-factive reading, which they paraphrase as 'p is unclear/false but they believe p.'

We can then conclude that in judgment tasks, uncontextualized utterances of *bil-* with matrix NPA give rise to the factive inference, while uncontextualized utterances of *bil-* with embedded NPA do not.

Non-deniability of entailments It is contradictory to deny the embedded proposition after asserting 34a. No contradiction arises after 34b.

(39) a. # Dilara [Aybike'nin sigara ictigini] BILIYOR ama ic**mi**yor.
D. A. cigarette smoke.NMZ knows but smoke.NEG
Dilara knows that Aybike smokes, #but she doesn't.

b. ✓ Dilara [Aybike'nin SIGARA ictigini] biliyor ama ic**mi**yor.
D. A. cigarette smoke.NMZ knows but smoke.NEG
Dilara believes that Aybike smokes, ✓ but she doesn't.

This suggests that the attitude report with matrix NPA entails or semantically presupposes the truth of the embedded clause, while the one with embedded NPA does neither.

Anti-presupposition Attitude reports with *bil-* are perfectly felicitous in contexts where the embedded proposition is true. Attitude reports with *düşün-* are somewhat odd.

(40) Aybike sigara iciyor ve...
Aybike smokes and...

a. ✓ Dilara [Aybike'nin sigara ictigini] BILIYOR.
Dilara knows that Aybike smokes.

[18] It is interesting that it is possible to paraphrase non-factive sentences with *bil-* with other non-factive verbs, but there does not seem to be an alternative paraphrase of factive sentences with *bil-*. That is, there does not seem to be a stronger relevant attitude verb.

b. # Dilara [Aybike'nin sigara ictigini] DUSUNUYOR.
Dilara thinks that Aybike smokes.

Traditional accounts of this contrast rely on the existence of pairs of attitude reports such that:

- both members have contextually equivalent assertions,
- one member of the pair is associated with a semantic presupposition that the embedded proposition is true.[19] [Percus, 2006, a.o.]

Given the contrast between *bil-* and *düşün-* here, we must conclude that the former is associated with a semantic presupposition, and that the latter is not. (If we do not draw this conclusion, we need a new account of anti-presupposition. Drawing the conclusion is preferable.) Note that *bil-* is acceptable in this context even though it introduces attitude reports that are 'ambiguous.' Indeed, the non-factive reading is not detected, presumably because it is (predicted to be) odd.

Projection The hallmark of presupposition is that it projects from the scope of non-veridical operators, while ordinary entailments are suspended. This is observed for attitude reports introduced by *bil-*. The sentence in 41, where *bil-* is negated, is intuitively associated with the global inference that Aybike smokes.

(41) Dilara [Aybike'nin sigara ictigini] bil-m-iyor.
D. A. cigarette smoke.NMZ know-NEG-PRES
Dilara doesn't know that Aybike smokes. $\rightsquigarrow$ Aybike smokes.

To capture projection, one either needs semantic presupposition (**refs**) or an ordinary entailment that gets backgrounded [Stalnaker, 1973/1999, a.o.]. While it might be possible to utter negated non-factive attitude reports with the inference that the embedded proposition is true, e.g., "Mary didn't believe me that I'm Turkish," this does not have the same systematicity as projection with factives, as illustrated in 41.[20]

In sum, we have direct evidence that attitude reports introduced by *bil-* must have a non-factive semantic representation. And we have direct and indirect evidence that attitude reports introduced by *bil-* must also have a factive semantic representation. Without the latter, we do not know how to explain anti-presupposition phenomena and projection.

These observations lead to the analytical desideratum in 42.

(42) **Desideratum**:
Attitude reports that participate in the factivity alternation are associated with two semantic representations, one factive and one non-factive.

[19] It is typically assumed that the attitude verb is the presupposition trigger in the relevant literature. I do not think it matters whether the inference is triggered by the verb, or comes to be associated with the LF of the attitude report by some other means. But of course, this is a topic that deserves further investigation.

[20] See Simons et al. [to appear] for a way of doing projection without presupposition or veridicality. But that account is not designed to handle projection with factives, which still relies on veridicality.

3.2.3. Phonetics and phonology: Attitude reports

In this section, I provide selected data from production studies suggesting that the prosodic correlate of the factive presupposition is indeed a shift in the position of the attitude report's NPA, as well as the (related) reorganization of pre-nuclear material.

To test this, attitude reports of various forms were elicited in pragmatic contexts that supported the factive inference or that did not. The pitch contours of these attitude reports were compared to one another, and to those of monoclausal declaratives reported in section 2.

To take an example, a target attitude report like 43a was elicited in the contexts provided in 43b. These contexts appeared on the screen, above the target sentence. They were not linguistically conjoined with the target sentence, and participants were not asked to read them (though they could, and sometimes did).

(43) a. **Target attitude report**:
Limonlululular [Memoli'nin marinayi aradigini] biliyor galiba.
Limonlu.DEM Memoli marina look.for know ADV
The people of Limonlu {know, believe} that Memoli is looking for the marina.

b. **Context types**:

i. Assertion
Memoli marinayi aradi.
Memoli looked for the marina.

ii. Maybe
Memoli marinayi aramis olabilir.
Memoli might have looked for the marina.

iii. Denial
Memoli marinayi aramadi.
Memoli hasn't looked for the marina.

iv. Ignorance
Memoli marinayi aradi mi emin degilim.
I'm not sure whether Memoli looked for the marina.

The context in 43b-i forces a factive interpretation, and is expected to elicit matrix verb NPA. The reason that this context elicits a factive interpretation is that the embedded proposition is asserted. The local context for the target utterance entails it and the attitude report's presupposition is satisfied. In similar contexts, non-factive counterparts ('competitors') of attitude reports introduced by *bil-* are not licensed, presumably because they are associated with an anti-presupposition.[21]

Contexts 43b-ii, 43b-iii and 43b-iv force a non-factive interpretation, and are intended to elicit the NPA in the embedded clause. The reason that these contexts force a non-factive interpretation is that the embedded proposition is given under a non-veridical operator: an epistemic possibility modal, negation, or an explicit statement of ignorance. It is odd to assert "It's possible that p" or "I wonder whether p" in contexts where the speaker is

[21] For the sake of completeness, I did attempt to elicit attitude reports introduced by *san-* and *düşün-* in contexts where the embedded proposition was presented as true. Participants systematically rejected such sentences. This is also why the particular design reported in 43 only included *bil-*.

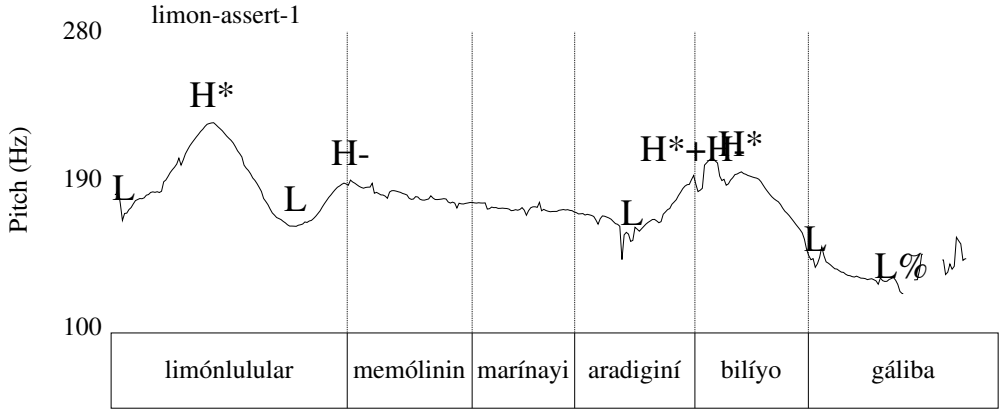
already committed to the belief that p. It is false to assert "not p." Consequently, the local context for the target utterances in 43b-ii through 43b-iv does not entail the embedded proposition. The attitude report's presupposition is not satisfied. Given the availability of a non-factive interpretation for these kinds of attitude reports, the participant would be expected to access it here.

Example 44 gives the prosodic structure and the pitch track of a target sentence in the 'Assert' condition.

(44) Memoli looked for the marina. (Assert)

a. ((limónlulular)$_\Phi$ (memólinin marínayi aradiginí)$_\Phi$ (bilíyor galiba)$_\Phi$)$_\text{I}$
The people of Limonlu know that Memoli is looking for the marina, I think.

b. Pitch track for 44a



What we observe here is that the matrix subject is mapped onto an intermediate phrase. We can conclude this because its right edge is marked with an H-. We can safely assume that there is a high target there, because in its absence, we would not expect a rise after the low target following the subject's H* pitch accent. The embedded clause is mapped onto another intermediate phrase, for the same reason. The nucleus of the sentence is the verb. We see that the verb's pitch accent is realized, and followed by a sustained low. Observe that the verb in these examples has final stress. This means that the high target seen at the right edge of the verb could be also be or be composed of pitch accent. I present evidence below, for the claim that there is also an ip boundary there, rather than a simple pitch accent.

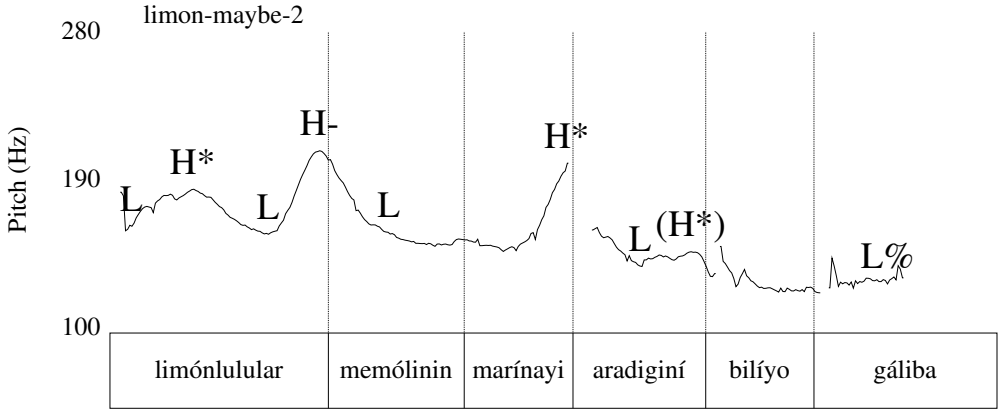
From the perspective of the variable realization of pitch accents in Turkish, observe that the embedded subject and the embedded object are deaccented. Other tokens produced by speaker DE are similarly deaccented. This raises questions about the variable realization of Turkish prosodic structures which are not, to my knowledge, well documented. I cannot, however, pursue the matter in the present paper.

The following examples give prosodic structures and pitch tracks for the item corresponding to 44 in the non-factive 'Maybe,' 'Deny,' and 'Question' conditions.

(45) Memoli might have looked for the marina. (Maybe)

a. ((limónlulular)$_{\Phi}$ (memólinin marínayi)$_{\Phi}$ (aradiginí bilíyor galiba)$_{\Phi}$)$_{\text{I}}$
The people of Limonlu know that Memoli is looking for the marina, I think.

b. Pitch track for 45a



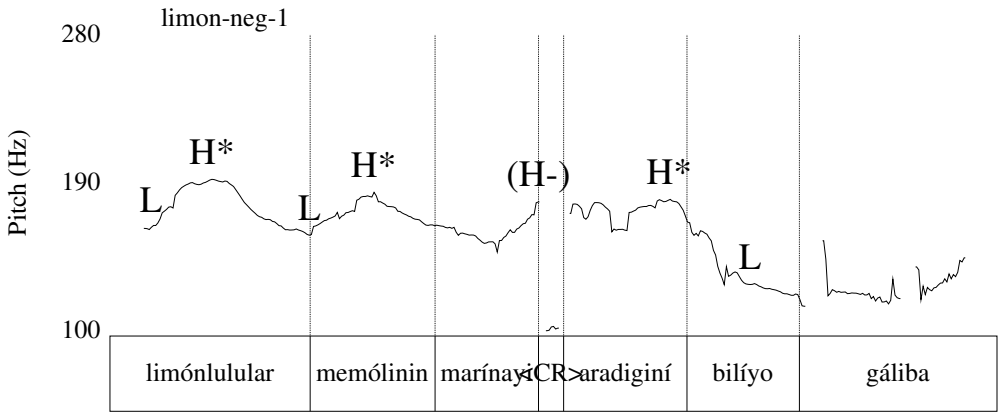
On the pitch track for this item, we see that the subject is mapped onto an ip. The embedded verb is preceded by an ip break, which suggests that the embedded subject and the embedded object map onto a single ip as well. It is worth noting that these items' pitch accents are not realized. The embedded verb is this sentence's nucleus. Observe that the nucleus's pitch accent is so compressed that it is almost not detectable.

On the next pitch track, for the corresponding item in the 'Deny' condition, we see that the matrix subject and embedded subject and direct object are mapped onto the same intermediate phrase. It appears that the intermediate phrase boundary that follows the matrix subject is not obligatory.

(46) Memoli hasn't looked for the marina. (Deny)

a. ((limónlululular memólinin marínayi)$_\Phi$ (aradiginí bilíyor galiba)$_\Phi$)$_1$
The people of Limonlu know that Memoli is looking for the marina, I think.

b. Pitch track for 46a



This has interesting consequences for the syntax-prosody mapping. In particular, not all syntactic constituent edges (for those constituents of the relevant size) correspond to prosodic constituent edges. So perhaps, from the presence of an edge tone, we may conclude that there is a syntactic edge, but from the absence of an edge tone, we might not be able to conclude that there is not a syntactic edge.[22]

The nucleus, in 46a, is again the embedded verb.

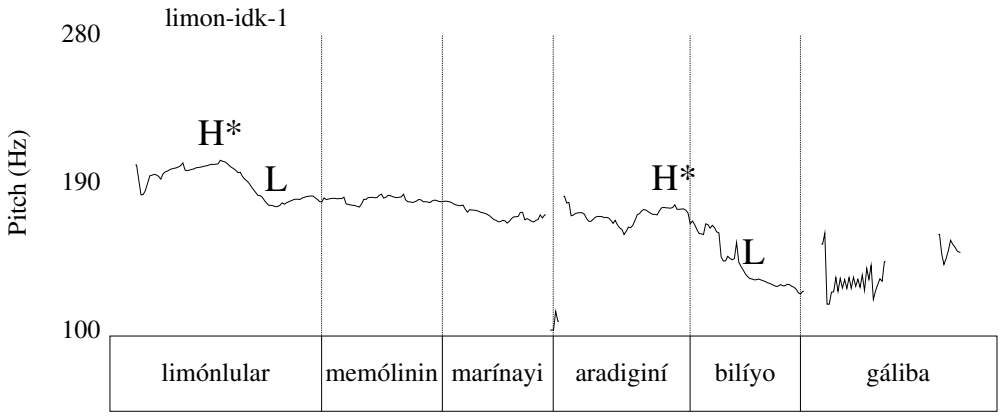
The pre-nuclear deaccenting/dephrasing produced by speaker DE is even more extreme in the following token. It is, however, possible to identify the nucleus here too, as the embedded verb. Note that in the absence of clear evidence in favor of a pre-nuclear intermediate phrase break, the two cues identifying the nucleus are its pitch accent (though compressed), and the sustained fall that follows it.

[22]This raises the question of whether one can *insert* prosodic constituent breaks 'in the middle' of syntactic units.

(47) I'm not sure whether Memoli has looked for the marina. (Question)

a. ((limónlulular memólinin marínayi)$_{\Phi}$ (aradiginí bilíyor galiba)$_{\Phi}$)$_{1}$
The people of Limonlu know that Memoli is looking for the marina, I think.

b. Pitch track for 47a



In sum, despite the variation observed for the organization of pre-nuclear material, we see that an attitude report elicited in a factive context has its nuclear pitch accent on the matrix verb, while attitude reports introduced in non-factive contexts have their NPA on an embedded constituent.

In the particular non-factive contexts given above, a discourse question is raised about the truth of the embedded proposition. The target attitude reports can be regarded as answering that question. The fact that the NPA falls on the embedded predicate, rather than, e.g., on the direct object, which would be its canonical position, is likely an effect of embedded polarity focus.

Discussion The design presented above had two main confounds. First, the 'Assert' condition makes the embedded proposition part of the common ground, and hence presupposable. But it also makes the embedded clause *discourse given*. One way of mitigating this confound is to elicit utterances of factive attitude reports out of the blue. The examples provided in the previous section—elicited out of the blue—make this point.

I had initially thought that givenness would not be a confounding factor for the reason that the factive and non-factive contexts alike mention the material included in the embedded clause. Take, for example, the assert context compared with the ignorance context:

(48) a. [Memoli marinayi aradi].
M. marina look.for
Memoli looked for the marina.

b. [Memoli marinayi aradi] mi emin degilim.
M. marina look.for Q sure NEG.1S
I'm not sure whether Memoli looked for the marina.

The embedded clause in the target attitude report features identically in both of the prompts,

so if one context makes the clause discourse given, so should the other. Based on this, it could be claimed that givenness is not a confounding factor and that the minimal difference between e.g., the assert condition and the ignorance condition was in whether the embedded proposition was common ground. This is not an entirely accurate statement, as, in addition to making the embedded clause given, contexts like 48b raise discourse questions about the embedded proposition. The fact that a question was raised about the embedded proposition should have the effect of *attracting* the NPA. This would interact with the expected effect of givenness, which is to *repel* the NPA. It is an open question whether any sentence could be uttered embedded under a non-veridical operator without raising a question about the truth of the embedded proposition [Simons, 2001]. This requires further research.

Second, the non-factive contexts all seem to involve raising a question about the polarity of the embedded proposition. The contexts were not pronounced, but presented in written form. So although intonation might serve to disambiguate between a polarity focus trigger and not, this was not used here.

(49) a. Memoli might be looking for the marina...
b. Memoli isn't looking for the marina...
c. I'm not sure whether Memoli's looking for the marina...
d. Peter thinks that he IS (looking for the marina).

The question then is, perhaps the presence of embedded polarity focus is driving the effect.

Non-factive contexts contexts can be constructed which do not involve embedded polarity focus. This was the object of another production study. Attitude reports introduced by *bil-* and *san-* were elicited as answers to *wh-* questions which questioned the embedded subject, object or the verb. The design is summarized in 50

(50) Design—Exp 2: Focus position

Factor 1 Verb	Factor 2 Focus position	Context
bil-	Emb. S	Kim marinayı aradı? Who looked for the marina?
	Emb. DO	Memoli nereyi aradı? What did Memoli look for?
	Emb. V	Memoli marinayı n'aptı? What did Memoli do to the marina?
san-	Emb. S	Kim marinayı aradı? Who looked for the marina?
	Emb. DO	Memoli nereyi aradı? What did Memoli look for?
	Emb. V	Memoli marinayı n'aptı? What did Memoli do to the marina?

Target sentence:
Romanyalılar Memoli'nin marinayı aradığını {biliyor, sanıyor} galiba.
The Romanians {know, believe} that Memoli is looking for the marina, I think.

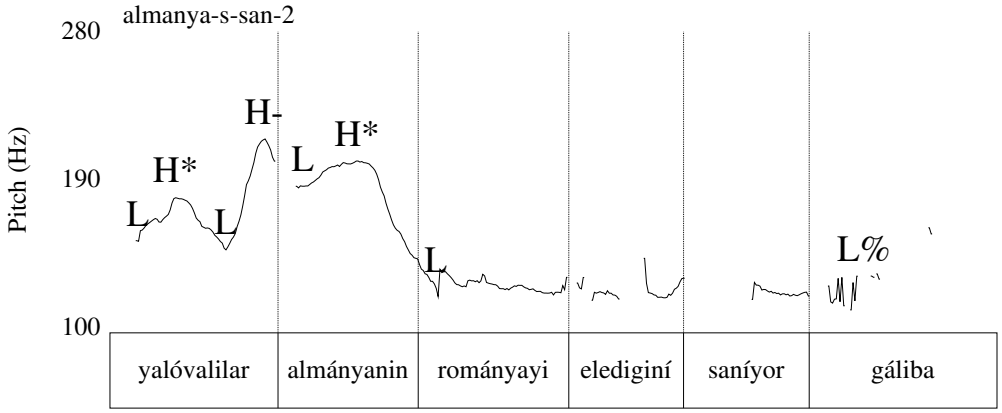
All of the contexts which these attitude reports were elicited in were non-factive. Indeed, if there is an overt question about the embedded proposition, it (ideally) cannot be presupposed.

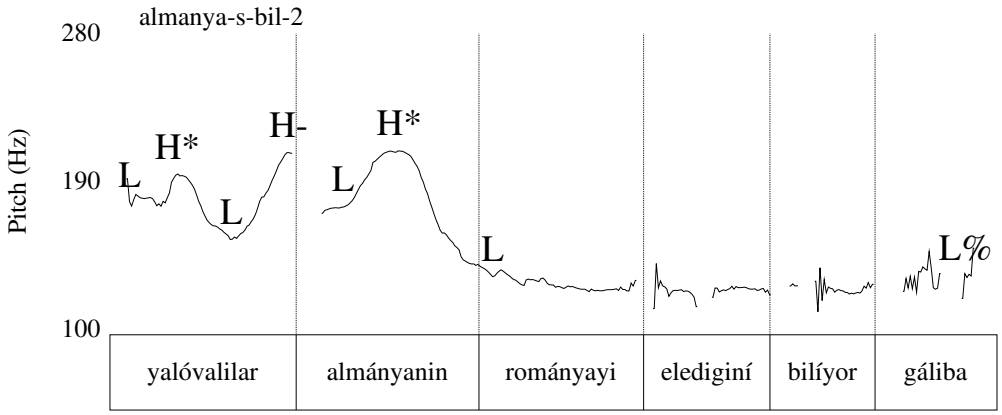
The following pitch tracks are from attitude reports elicited in the subject embedded focus condition.

(51) Who defeated Romania?

a. (yalovalilar)$_{\Phi}$ (almanyanin romanyayi elediginі saniyor/biliyor)$_{\Phi}$
yalova.DEM germany romania defeat believe/know
The people of Yalova believe that GERMANY defeated Romania.

b. Pitch tracks for 51a





We observe that the matrix subject's H* pitch accent is realized, and that its right edge is marked by an H- ip boundary tone. This H- is also the pre-nuclear ip break. The embedded subject, which is the answer to the *wh*- question from the prompt, is the nucleus. Its pitch accent is realized and followed by a low tone that is sustained until the end of the utterance.

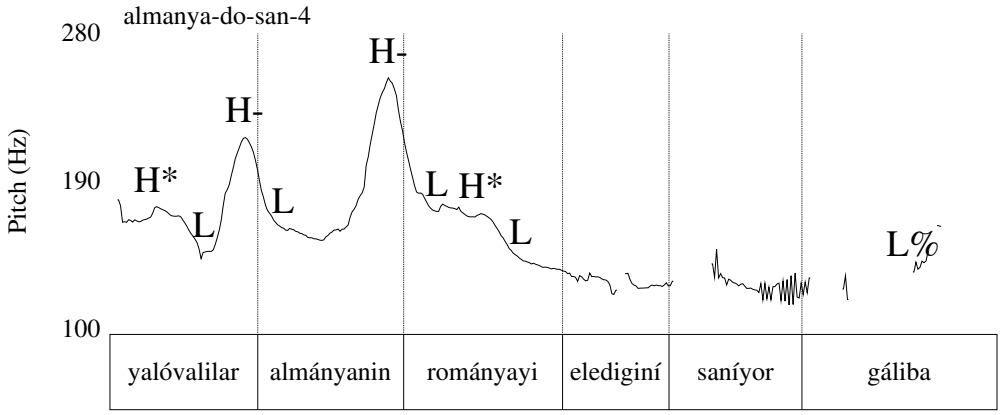
Similar observations apply to non-factive attitude reports elicited as an answer to an object *wh*- question. This is illustrated in the next two pitch tracks, where the nucleus is the

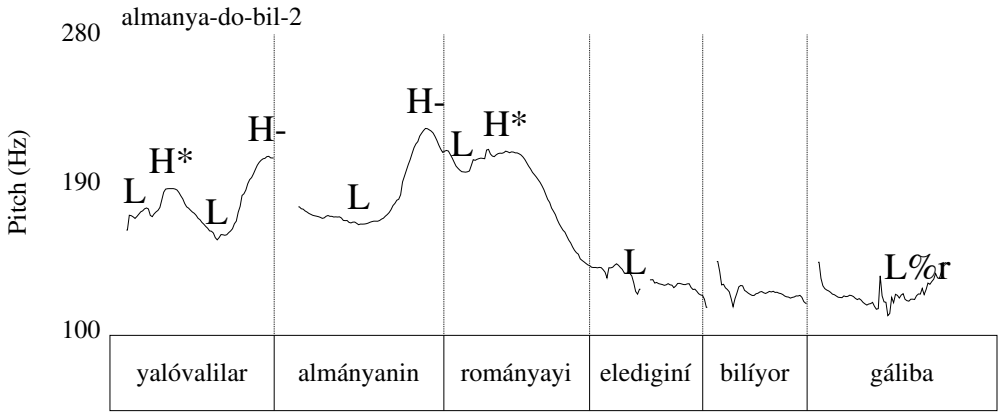
embedded direct object.

(52) Who did Germany defeat?

a. (yalovalilar)$_{\Phi}$ (almanyanin)$_{\Phi}$ (romanyayi elediginі saniyor/biliyor)$_{\Phi}$
yalova.DEM germany romania defeat believe/know
The people of Yalova believe that Germany defeated ROMANIA.

b. Pitch tracks for 52a





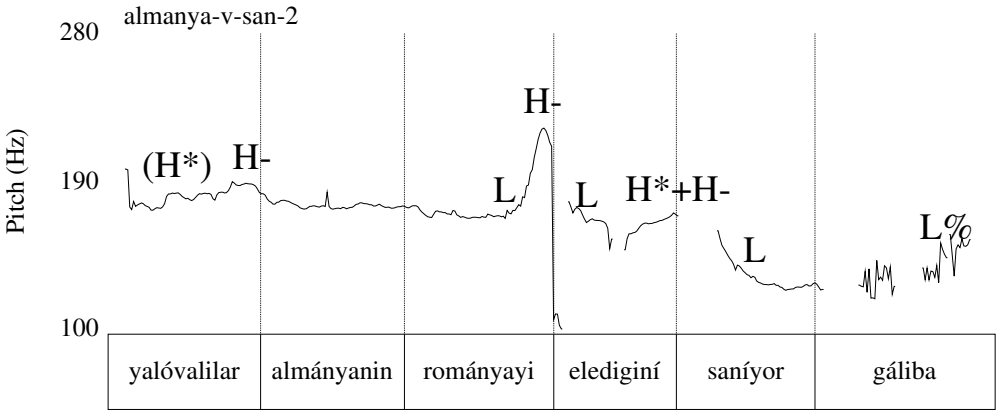
The next two examples are the counterparts of the sentences above elicited in response to a *wh-* question that questions the verb. In both sentences, the nucleus can reliably be identified to be the embedded verb. The phrasing of pre-nuclear material is, however, different across the two sentences. I am unable to tell at this stage whether verb choice makes a difference here, or whether this is an instance of intra-speaker variability.

For the token with *san-*, we see that the matrix subject maps onto an ip, and that the embedded subject and embedded object map onto another.

(53) What did Germany do to Romania?

a. (yalovalilar)$_\Phi$ (almanyanin romanyayi)$_\Phi$ (elediginі saniyor)$_\Phi$
yalova.DEM germany romania defeat believe
The people of Yalova believe that Germany DEFEATED Romania.

b. Pitch track for 53a



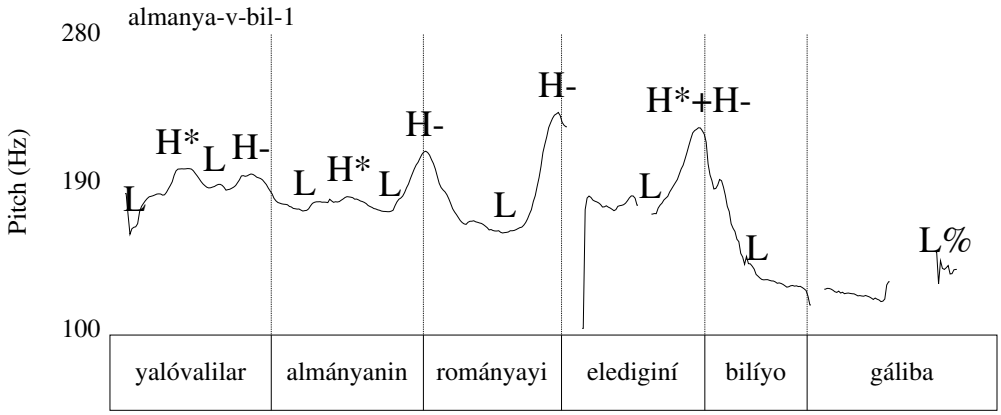
Pitch movements on the matrix subject are compressed, and those on pre-nuclear material within the embedded clause are suppressed.

For the token with *bil-*, we see less of this compression. The matrix subject, the embedded subject and the embedded object map onto distinct ips. The nucleus is the embedded predicate.

(54) What did Germany do to Romania?

a. (yalovalilar)$_\Phi$ (almanyanin)$_\Phi$ (romanyayi)$_\Phi$ (elediginі biliyor)$_\Phi$
yalova.DEM germany romania defeat know
The people of Yalova believe that Germany DEFEATED Romania.

b. Pitch track for 54a



An intermediate phrase around the embedded clause In the attitude report examples discussed thus far, the embedded verb's stressed syllable was word final. This makes the high target observed at the right edge of the embedded clause compatible with being a H* pitch accent, or a H- intermediate phrase boundary (or a combination of both).

Examples can be constructed, however, where the verb's stressed syllable is not word final. This is illustrated in 55. There is a set of verbal suffixes that prevents stress from moving rightwards, the language's so-called 'prestressing' suffixes (**citations**). Negation is one such suffix. In 55 stress on the embedded predicate is peninitial.

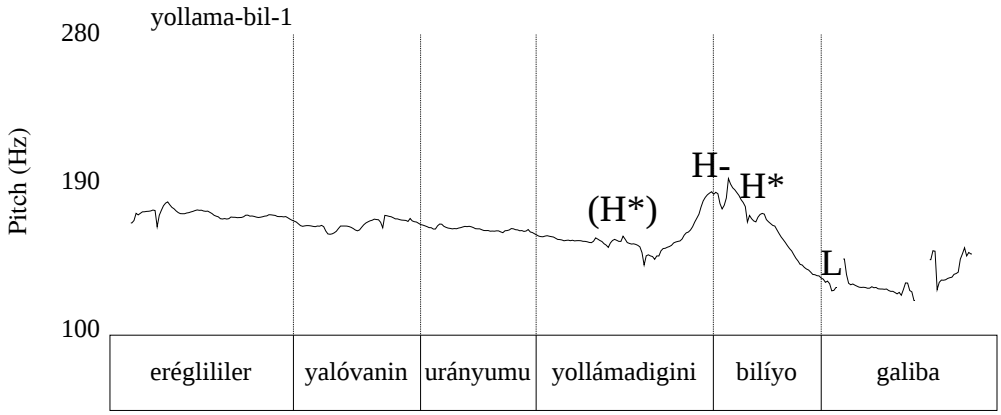
(55) románayalilar memólinin marínayi ará-**ma**-digini bilíyor
Romanians Memoli marina look.for-NEG-NMZ know
The Romanians know that Memoli isn't looking for the marina.

In examples like 55, if a high target is still observed at the right edge of the embedded clause, we can conclude with some confidence that it is an H- edge tone.

I have collected utterances from DE that follow the structure in 55. One such utterance is given in 56. The embedded verb is negated, so its stressed syllable is the one preceding the negative morpheme. We expect two tonal events on the verb, then. An H* pitch accent aligned with the stressed syllable, and an H- ip boundary tone aligned with the right edge of the embedded clause. Given, however, that DE tends to heavily deaccent and dephrase their utterances, we only observe the pre-nuclear ip break in 56 (this example is representative of other similar tokens collected from this speaker).

(56) a. ereglililer yalóvanin urányumu yollá-**ma**-digini bilíyor gáliba
Eregli.DEM yalova uranium send-NEG-NMZ know ADV
The people of Eregli know that Yalova has not sent the uranium, I think.

b. Pitch track for 56a

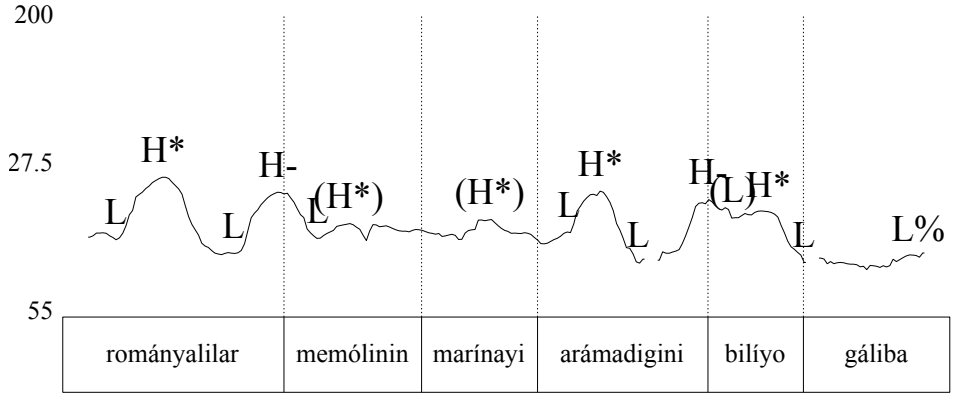


This constitutes tentative evidence that the high target at the right edge of the embedded clause is not a pitch accent. However, this conclusion relies on independent facts about the language. Ideally, we would like to observe both the verb's pitch accent and the edge tone before concluding that they are phonologically distinct tones.

For present purposes, I have recorded myself uttering 57a in an out of the blue context, using careful but not unnatural enunciation. What we see on the pitch track is two tonal events on the embedded verb, its pitch accent and an H- ip boundary tone. Note that the pitch movements on the embedded subject and the embedded object are compressed here, which makes it likely that speaker DE's production is not exceptional.

(57) a. ((románya**lilar**)$_{\Phi}$ (memólinin marínayi ará-**ma**-digini)$_{\Phi}$ (bilíyor gáliba)$_{\Phi}$)$_{I}$
Romanians Memoli marina look.for-NEG-NMZ know ADV
The Romanians know that Memoli isn't looking for the marina, I think.

b. Pitch track for 57a

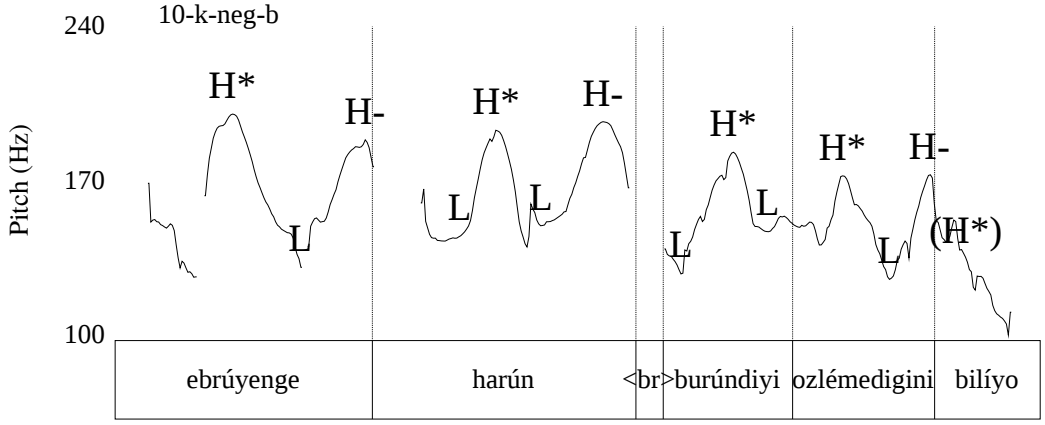


For completeness, I provide in 58a a token from an elicitation session conducted with speaker İKB.[23] In 58a, the matrix verb is utterance final, so we do not clearly see pitch movements there. And not all segments are sonorants, so this introduces some gaps and perturbations in the pitch track. We do see however that the embedded verb hosts two tonal events: A word medial H* pitch accent and a word final H- boundary tone.

[23]The 'problem' with İKB's intonation is the opposite of DE's.

(58) a. ((ebrú yenge)$_{\Phi}$ (harún beyin) (burundiyi ozle-me-digini)$_{\Phi}$ (biliyo)$_{\Phi}$)$_{I}$
Aunt Ebru Mr. Harun Burundi miss-NEG-NMZ knows
Aunt Ebru knows that Mr. Harun doesn't miss Burundi.

b. Pitch track for 58a



3.3. Interim conclusion

We have seen that factive attitude reports have an intonation pattern that is distinct from that of non-factives. In addition, we have seen that the attitude reports that have been claimed to be factive are associated with a semantic representation that encodes the factive inference, and those that have been claimed to be non-factive are not—even in cases where a single given string can be interpreted as factive or not.

The results are summarized in 59. The 'ideal' representation of the prosodic structure of a factive attitude reports involves mapping the matrix subject, the embedded clause and the attitude verb onto three distinct intermediate phrases. The attitude verb is the nucleus. In the ideal representation of the prosodic structure of a non-factive attitude report, the nucleus is in the embedded clause—as a result, the pre-nuclear intermediate phrase break breaks into the syntactic constituent formed by the embedded clause..

(59) a. Factive attitude report
[Mat. Subj. [[. . . XP . . .]$_{NMZ}$ Att. V$_{NUC}$]]
(( )$_{\Phi}$ ( )$_{\Phi}$ ( )$_{\Phi}$)$_{I}$

b. Non-factive attitude report
[Mat. Subj. [[[. . .] [XP$_{NUC}$ . . .]]$_{NMZ}$ Att. V$_{NUC}$]]
(( )$_{\Phi}$ ( )$_{\Phi}$ ( )$_{\Phi}$)$_{I}$

With these results in mind, let us derive the semantics for factive attitude reports and see how this might interact with prosodic structure.

4. Deriving the factivity alternation

Recall our prosodic factivity alternation example, repeated from above.

(34) Out of the blue

a. Dilara [Aybike'nin sigara ictigini] BILIYOR.
D. A. cigarette smoke.NMZ knows
Dilara knows that Aybike smokes. $\rightsquigarrow$ Aybike smokes.

b. Dilara [Aybike'nin SIGARA ictigini] biliyor.
D. A. cigarette smoke.NMZ knows
Dilara believes that Aybike smokes. $\not\rightsquigarrow$ Aybike smokes.

Different tests for entailment and presupposition had revealed that 34a patterns like an attitude report that presupposes the embedded proposition, and that 34b neither presupposes, nor entails it. Thus, attitude reports like the ones in 34 need to be associated with one factive and one non-factive semantic representation. This section proposes a way of achieving this goal. How to handle the interface with prosodic structure is the topic of section 5.[24]

Presuppositions are usually thought of as being 'triggered' by certain lexical or functional items. Descriptively, these are items like 'know', 'start' or 'stop,' 'the,' etc., or syntactic frames like clefts. In 34, there is no obvious candidate for a trigger. In the literature on the factive inference, some authors entertain the hypothesis that the inference is encoded in the semantics of certain attitude verbs [Hintikka, 1962, a.o], and others, the hypothesis that it is encoded in the semantics of certain clauses [Kiparsky and Kiparsky, 1970, a.o.]. The latter type of proposal has recently been revived by authors like Kratzer [2006], Moulton [2009], Hanink and Bochnak [2017], etc. If we naively consider, here, either that the verb *bil-*, or that the nominalized embedded clause encodes the factive inference, we make the wrong prediction that 34b should be factive. This prediction is made because the string in 34b contains both *bil-* and a nominalization, and the presence of the trigger is a sufficient condition for observing the presupposition—at least in unmarked contexts and when the trigger is unembedded (as is the case for 34).

These observations suggest that attitude verbs that participate in the factivity alternation have a regular non-factive Hintikkan semantics, as in 60 [Hintikka, 1962],

(60) $[\![\text{bil-}]\!](w)(p_{st})(x_e) = 1$
iff for all worlds w' compatible with what x believes at w, $p(w') = 1$
(the set of those worlds w' compatible with what x believes at w need not include w)

and, furthermore, that nominalizations denote regular propositions.

(61) $[\![\text{Aybike'nin sigara ictigi}]\!](w) = 1$ iff Aybike smokes at w

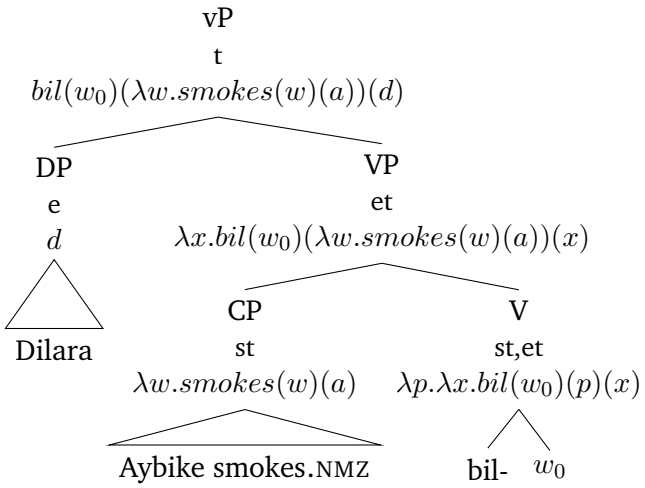
This straightforwardly accounts for the non-factive reading in 34b. To account for the factive reading, I make use of a covert functional head occuring with certain nominalized clauses, defined and motivated in section 4.2. (This puts the present proposal in line with recent attempts to encode the factive inference in the semantics of embedded clauses, but, as we will see, with interesting differences.)

[24] There is an intuition that contrasts like 34 bring forward, that I repress for practical purposes. The intuition is that prosodic structure, in 34, might be revealing a way that information is structured such that the embedded proposition comes out presupposed in 34a, without appealing to two distinct semantic representations.

4.1. Capturing the non-factive reading

Given the assumptions in 60 and 61, the non-factive reading 'comes for free.' The simplified structure and the semantics of a non-factive attitude report are illustrated in 34b. The embedded clause merges as the complement of the attitude verb and is interpreted in situ by function application. The subject is introduced next, and composes by function application as well.

(62) LF for the non-factive attitude report 34b



The following truth conditions are derived for the attitude report:

(63) $[\![\text{vP}]\!] = 1$ iff for all worlds w' compatible with what Dilara believes at w_0, Aybike smokes at w'.

As there is nothing in 34b that encodes factivity, these truth condtions are non-factive. That is, they neither entail nor presuppose the truth of the embedded proposition.

4.2. Capturing the factive reading

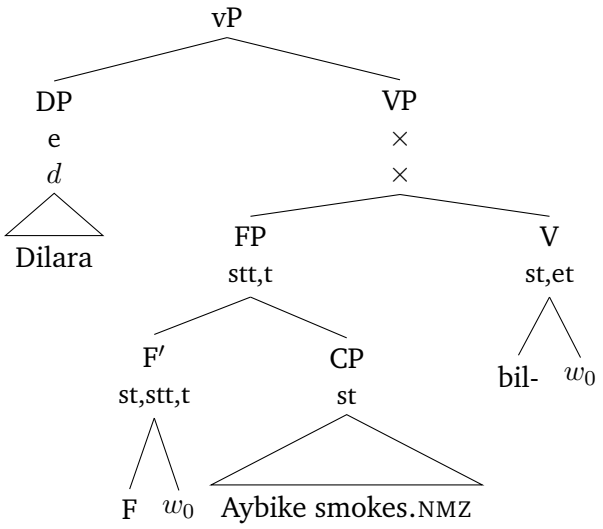
Something extra is required to derive the factive reading. I propose to make use of the functional item defined in 64, which I leave unmotivated for now.

(64) $[\![\text{F}]\!] = \lambda w_s.\lambda p_{st}.\lambda Q_{st,t}.p(w) \wedge Q(p)$

F composes with a proposition and a predicate of propositions, asserts the proposition and feeds it into the predicate.

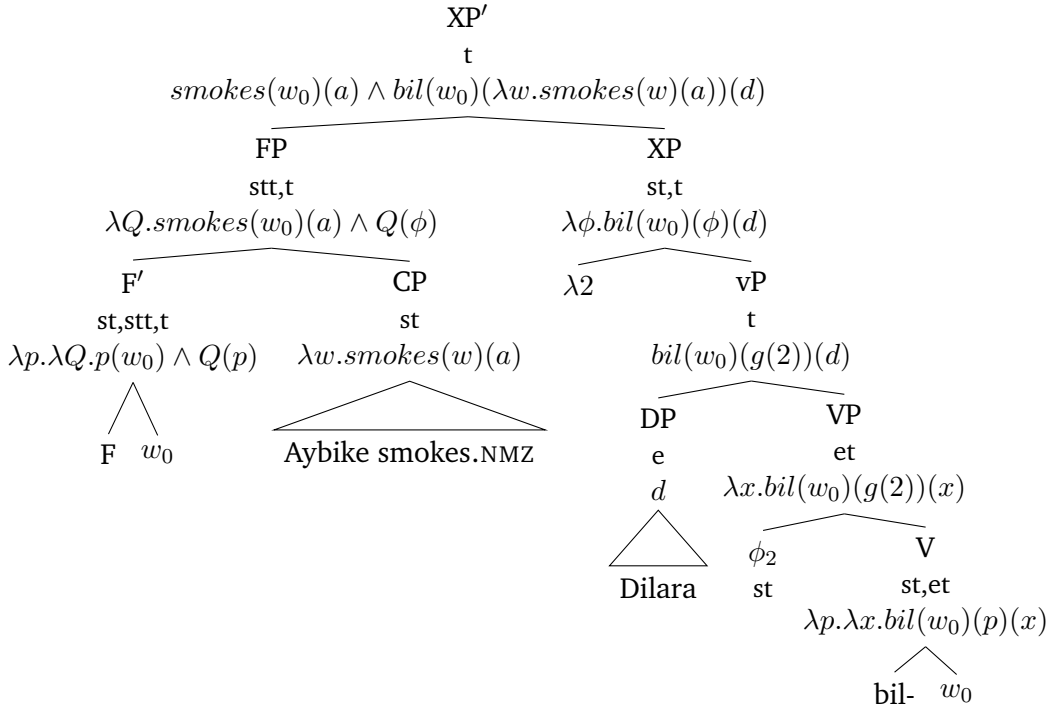
In the derivation of the factive reading, F merges with the nominalization, and the resulting FP merges as the complement of V. This creates a type mismatch: The FP is of type stt,t, which is a function from sets of propositions to truth values, and the attitude verb is looking to compose with a plain proposition, of type st. They cannot compose (with the basic set of rules that I am assuming).

(65) Type mismatch



To resolve the mismatch, the FP raises, and leaves behind a trace of type st. The attitude verb can now compose with the trace. The subject is introduced standardly. At the node labeled XP, the trace of the FP is abstracted over. This step creates an object of type stt. The FP, which is looking for an object of this type, takes the XP as its complement.

(66) LF for the factive attitude report in 34a



The effect of the head F is to assert the embedded proposition and to feed it into the

function denoted by XP, which amounts to feeding it into the belief predicate. This results in the following truth conditions for factive attitude reports introduced by *bil-*.

(67) $[\![\text{XP}']\!] = 1$ iff Aybike smokes at w_0 and for all worlds w' compatible with what Dilara believes at w_0, Aybike smokes at w'

We have successfully derived our factive inference as one of the conjuncts in these truth conditions. Its status at this stage is that of an ordinary entailment. We could consider modifying the lexical entry of F in such a way that the proposition is semantically presupposed. Or, we could make use of a presupposition calculation algorithm like the one proposed by Abrusán [2011a], that turns a subset of a sentence's ordinary entailments into presuppositions.

I have presented the derivations in these two sections as semantic derivations. However, for the purposes of the interface with phonology, we might want to think about these derivations as syntactic. This means that in addition to getting the truth conditions right, we need to think about two more things.

First, word order. In 4.2, the FP was shown to raise to a position higher than the subject. Yet, the embedded clause in factive attitude reports do not necessarily precede the subject. We must then assume that the landing site of the embedded clause is in fact lower than the subject, or, alternatively, that the subject raises to a position that is higher than the embedded clause, in a structure like 4.2.

Second, the movement step in 4.2 was presented as being driven by a type mismatch. This is a semantic operation. It seems like if we move to modeling this movement step in the syntax, this motivation will be lost. This need not be aconcern, however. The syntax can be modeled as generating two representations, one with FP movement and one without, the latter of which is filtered out in the semantics because it is not interpretable.

4.3. Discussion

Quantifier raising The semantics of the head F might seem ad hoc. This is but a presentational concern. F could be implemented as an existential quantifier over situations.

(68) $[\![\text{F}]\!] = \lambda w.\lambda p_{st}.\lambda Q_{st,t}.\exists s[s \leq w \wedge p(s) \wedge Q(p)]$

If F is considered to be a quantifier, the reason that it moves can be linked to quantifier raising.[25] The parallel between F and a generalized quantifier is, however, not exact. This can be seen by comparing F to the following definitional schema for generalized quantifiers:

(69) $[\![Q]\!] = \lambda w.\lambda A_{et}.\lambda B_{et}.Q(A)(B)$

To note here is that a generalized quantifiers restrictor (A) and scope (B) arguments are of the same type. This is not the case in 68, where p is of a lower type than Q. I will be satisfied here with pointing out this conceptual similarity, and this technical difference.

[25] As Simon Charlow (p.c.) points out, this formulation is equivalent to the one given above, modulo the assumption that the proposition p is persistent. This opens the possibility that the existential quantifier introduced by F might interact with other quantifiers in the structure. This is interesting: I believe that when I say "Everyone knows that Mary smokes," it is possible that every attitude holder is acquainted with a distinct situation that exemplifies the proposition that Mary smokes. I wonder if this could be captured by assuming an existential quantifier in the structure of attitude reports, quantifying over the attitude proposition.

The scope of movement Sabine Iatridou (p.c.) has raised a concern with this kind of analysis, as, at first sight, it seems to handle presupposition projection via the same raising mechanism. This makes it seem like in sentences like 70, where the presupposition trigger is embedded under a non-veridical operator (if) that is also an island (the antecedent of a conditional), the FP must raise out of the island up to the matrix clause to account for the available, projection reading.

(70) [Eğer Dilara Aybike'nin sigara içtiğini biliyor-sa] çok üzülmüştür.
PRT D. A. cigarette smoke.NMZ know-COND very sad.EPIS
If Dilara knows that Aybike smokes, she must be very sad.

The present analysis would run into difficulties if we find that factive readings are available when we embed *bil-* and the embedded clause in environments out of which movement is restricted. The objection can be answered in two different ways. First, it it is unclear that Turkish has many islands. For example, it is possible to extract out of the antecedent of a conditional:

(71) [Eğer _____ Aybike'nin sigara içtiğini biliyor-sa] Dilara çok üzülürüm.
PRT A. cigarette smoke.NMZ know-COND D. very sad.1S
If Dilara knows that Aybike smokes, I would be be very sad.

In 71, the subject of the antecedent has been moved out without causing ungrammaticality, which suggests that the antecedent is not an island.

To be thorough, it should be established whether this kind of movement changes scope relations. I will only offer the sketch of an argument here.[26] In 72, a quantifier phrase is the subject of the antecedent of a conditional. In 72a, it is left in situ, in 72b, it is overtly moved out.[27]

(72) a. [Eger [2'den az kisi]$_{QP}$ gectiyse] Paul uzuldu.
PRT fewer than 2 pass.COND Paul got sad
If fewer than 2 students failed, Paul got sad.

b. [2'den az kisi]$_{QP}$ [[eger _____ gectiyse] Paul uzuldu.]
fewer than 2 PRT pass.COND Paul got sad
For fewer than 2 students, if they failed, Paul got sad.

Take the following context:

(73) There are 5 students: a, b, c, d, e.
Paul hates a and doesn't want him to pass.
What happens is that a, b, and c pass, and d and e fail. (More than two pass.)

In this context, sentence 72b describes a situation where Paul is sad. Sentence 72a, on the other hand, does not. It is compatible with Paul's happiness. This observation suggests that there is a truth conditional difference between 72b and 72a that is caused by the relative scope of a quantifier phrase and the conditional. As a result, in sentences like 70, the

[26]I extend my thanks to Paloma Jeretič for help with the examples and contexts.

[27]Prosodic phrasing reveals, here too, differences in syntactic structure. My judgments are given for the one corresponding to a structure where the QP outscopes the conditional.

need to move the embedded clause all the way up to the matrix clause should not be an immediate concern.

Second, it is possible to account for projection without raising the FP "all the way up," if we assume that a mechanism like the one proposed by Abrusán [2011a], which turns certain ordinary entailments into presuppositions, is operative.[28] In this case, it should suffice to derive a local entailment, which falls under the scope of the conditional, and apply the presupposition derivation algorithm there, to derive a global inference.

String vacuity Note that in the case that we are looking at here, this 'short' movement of the embedded clause is string vacuous. We will see in section 5 that prosodic structure tracks this movement step. So although movement is *string* vacuous, it could potentially be detected in the prosodic structure of factive attitude reports.

In the present system, not all kinds of movement of clauses are assumed give rise to a factive interpretation. For example, we can overtly prepose or extrapose clauses in Turkish. Take 74, for instance. A nominalized clause has been overtly moved to the left of the clausal subject. This results in a shift in the focus structure of the sentence—let us assume for concreteness that we are looking at a sentence where the subject is under narrow focus. This sentence is compatible with both a factive and a non-factive interpretation.[29]

(74) [Aybike'nin sigara ictigini] DILARA __ biliyor.
A. cigarette smoke.NMZ D. knows

a. DILARA knows that Aybike smokes.

b. DILARA believes that Aybike smokes.

To capture the existence of an alternation in 74 in the present system, I must assume that the factive reading is obtained by QR of an FP followed by preposing the FP, and that the non-factive reading is directly obtained by preposing a CP. However, it is predicted that any movement driven by FP will result in a factive reading.

Selection A final note is in order about the distribution of F. We have seen that tensed clauses never gave rise to a factive interpretation. Is there anything that prevents F from composing with tensed clauses? I believe this could be made to fall out of the nominal vs. clausal nature of nominalizations vs. tensed clauses. Indeed, we see overt quantifiers composing with nominalizations, but never with tensed clauses:

(75) a. Ali'nin (her) gel-me-sini gordum.
Ali every come-NMZ-3S.ACC I saw
With "her": I saw every one of Ali's comings.
Without "her": I saw Ali's coming.

b. i. Ali (*her) geldi diye gordum.

ii. (*Her) Ali geldi diye gordum.
every Ali came DIYE I saw
Intended: I saw every one of Ali's comings.
Available: (I thought) I saw Ali came.

[28] Again, thanks to Simon Charlow (p.c.) for making this point.

[29] To be sure that we have a factive interpretation, we would need to create a context in which the embedded proposition is true, and compare the acceptability of 74 to its counterpart with *düşün-*.

A nominalizer distinct from the one we have seen up to now has been used here. But this should illustrate the point.

We have also seen nominalizations composing with verbs like *san-* and *düşün-* without giving rise to factive interpretations. Why can these verbs not embed FPs? Perhaps this too can be encoded in the selectional requirements of these verbs.

Interaction with matrix tense The structural difference between factive and non-factive attitude reports involves the height at which the embedded clause is interpreted. This possibly predicts that the embedded clause should interact differently with surrounding scope-taking material, including tense. I leave the exploration of these predictions for further research.

5. The interface with prosody

We now have a working hypothesis about the structure and the semantics of (at least a subset of) factive attitude reports. The question we started out with, however, is about how to model the interaction between the availability of the factive inference and the prosodic structure of an attitude report.

We also have a general hypothesis about how to model this interaction—the difference in prosodic structure must be regarded as an 'effect' of the factive inference.

5.1. Hypothesis I: Syntax-prosody mapping

There is a question as to whether the prosodic structure of sentences can be derived from their syntactic structure. Many researchers answer positively. Syntactic constituents of a certain size are thought to map onto prosodic constituents of different sizes, (e.g., VPs, DPs, PPs, etc., to intermediate phrases, CPs to intonational phrases). The default position of pitch accents, including that of a sentence's nuclear pitch accent, is thought to be computed within certain syntactic domains.[30]

In Turkish, it is thought that pre-nuclear syntactic constituents map onto intermediate (or 'phonological') phrases. In addition, there is a syntactic domain including the verb and some of its arguments and modifiers which hosts the nuclear pitch accent. Sentence 76 illustrates. The domain within which the NPA is assigned contains the verb and its dative argument. The dative argument is the 'highest' non-null item within that domain and gets the NPA. The temporal adverb and the clause subject are outside of that domain and are parsed into ips.

(76) [[ ] [[ ] [ ]]]
((ali'nin$_\omega$ arkadasi$_\omega$)$_\Phi$ (sabahlari$_\omega$)$_\Phi$ (OKULA$_\omega$ gider$_\omega$)$_\Phi$)$_\mathrm{I}$
ali's friend mornings to school goes
Ali's friend goes to school in the mornings.

According to Kahnemuyipour [2009], who assumes a phase based approach to the question of stress assignment, nuclear stress is assigned to the syntactically highest item within the spell out domain of v.[31] In SOV languages, this predicts that the nucleus is some prosodic

[30] I cannot do justice here to the wide body of literature on the topic. For a general overview, see Legate [2003], Kratzer and Selkirk [2007], Kahnemuyipour [2009], Féry [2016] among others. For analyses of Turkish in particular see Kan [2009], Kamali [2011], Güneş [2015], İpek [2015].

[31] Kahnemuyipour's and related algorithms apply iteratively in higher phases and determine various accented

word close, but not necessarily linearly adjacent to the verb. Or when that domain is vacated, the nucleus is the verb. This is accurate for Turkish, modulo certain general syntactic assumptions about which constituents fall within the stress domain and which constituents fall without.[32] For concreteness, I will follow Kahnemuyipour and label the relevant syntactic domain for the computation of the position of the NPA as AspP.

It suffices to note, for present purposes, that direct objects that bear accusative case *can* host the NPA out of the blue. (This is where Persian might differ from Turkish, or else further scrutiny is required.) Additionally, in the absence of any vP internal material, the verb is accented.

(77) What's up?

a. Ali [$_{vP}$ v | AYŞE'Yİ öptü |] — Nuclear stress domain
Ali Ayse.ACC kissed
Ali kissed Ayse.

b. Ali [$_{vP}$ v | İÇTİ |]
Ali drank

If the general reasoning behind Kahnemuyipour's proposal is on the right track, the pattern in 77a suggests that accusative marked objects fall (and are the highest elements) within the syntactic domain where nuclear stress is assigned. Nominalized clauses are morpho-syntactically similar to accusative marked objects. Consequently, nominalized clauses embedded in non-factive attitude reports can be regarded as eligible to host the NPA in the same accusative marked lexical DPs are.

In the previous section, I have proposed to account for the difference between factive and non-factive readings for alternating attitude reports in terms of the height of the embedded clause. This difference is schematized in 78. I am making three assumptions here. First, that this structural difference affects all attitude reports, and not just alternating ones. That is, non-factive attitude reports have the structure in 78a and factive ones, the one in 78b. Furthermore, that this structural difference is a syntactic one (rather than a 'covert' LF operation). This will ensure that these syntactic structures can interface with phonology. And last, that while the nominalization stays within the AspP stress domain for non-factives, it moves out of it for factives, raising past the vP.

(78) a. Syntax: [S [$_{AspP}$ CP V]]
Semantics: Non-factive

b. Syntax: [S [CP [$_{vP}$ __ V]]]
Semantics: Factive

It is then tempting to think that the prosodic difference between factive and non-factive attitude reports could be linked to this structural difference. This allows us to formulate the

prosodic words. Why the nucleus is singled out as special and is the rightmost one requiresfurther discussion, which is outside the scope of the present paper.

[32] In particular, DOM objects are assumed to raise to Spec, vP in Turkish, which falls outside the spellout domain of v. Yet, DOM objects can be nuclei out of the blue. The ordering of DOM objects and vP level adverbs deserves further discussion. The facts might be different in Persian and Turkish. Kalin and Weisser [2017] present data consistent with a movement analysis (thanks to Ethan Poole, p.c., for mentioning this point, and to Travis Major for discussion).

following hypothesis:

(79) The prosodic structure of non-factive attitude reports differs from the prosodic structure of factive attitude reports as a result of a difference in the syntactic structure of the two types of attitude reports.

5.1.1. The prosodic structure of non-factive attitude reports

Take 80, which is our familiar non-factive attitude report annotated for stress domains, and syntactic and prosodic structure.

(80) Dilara [$_{vP}$ [Aybike'nin [$_{vP}$ SIGARA ictigini]] biliyor]

Dilara [Aybike'nin SIGARA ictigini] biliyor
( )$_\Phi$ ( )$_\Phi$ ( )$_\Phi$
D. A. cigarette smoke.NMZ knows
Dilara believes that Aybike smokes cigarettes.

Following the general NPA assignment algorithm described in section 5.1, the NPA should fall within the embedded clause. This is indeed the syntactically highest constituent within v's spellout domain. Within the CP, the same process applies as well. This places the NPA on the embedded direct object, 'cigarette.'

Additional syntax prosody mapping principles then[33] apply and map the embedded and matrix subjects to intermediate phrases. Similarly, post-nuclear material is 'deaccented and dephrased.' The entire utterance maps on to an intonational phrase. This results in the (canonical) prosodic structure given in 81.

(81) ((Dilara$_\omega$)$_\Phi$ (Aybike'nin$_\omega$)$_\Phi$ (SIGARA$_\omega$ ictigini$_\omega$ dusunuyor$_\omega$)$_\Phi$)$_I$

5.1.2. The prosodic structure of factive attitude reports

Take 82, which is a factive attitude report. Recall that the embedded clause vacates the vP.

(82) Dilara [$_{FP}$ F [Aybike'nin sigara ictigini]] [$_{vP}$ ___ BİLİYOR]

Dilara [Aybike'nin sigara ictigini] BILIYOR
( )$_\Phi$ ( )$_\Phi$ ( )$_\Phi$
D. A. cigarette smoke.NMZ knows
Dilara knows that Aybike smokes.

The NPA assignment algorithm tells us that the highest prosodic word within the vP's spell out domain receives the NPA. Given that the embedded clause has vacated the vP, it is no longer eligible to receive the NPA. What remains is the matrix verb *bil*, which gets it.

The computation of additional prosodic units wraps an intermediate phrase around the embedded clause, and the matrix subject (which are pre-nuclear). This predicts the following canonical prosodic structure for factive attitude reports:

(83) ((Dilara$_\omega$)$_\Phi$ (Aybike'nin$_\omega$ sigara$_\omega$ ictigini$_\omega$)$_\Phi$ (BILIYOR$_\omega$)$_\Phi$)$_I$

[33] I do not make strong assumptions about the temporal ordering of these operations. The ordering here is expository.

5.1.3. Discussion

The proposed syntax and semantics that derives factive and non-factive readings is essentially based on Quantifier Raising the embedded clause and having it scope over the quantifier over possible worlds introduced by the attitude verb.

The main question that this is raises is whether there are other cases where we find prosodic structure tracking relative scope. And there seem to be. Not any example will do however. We need a specific case where it is QR that results in a difference in prosodic structure.[34]

Recall our examples where accusative marked direct objects receive the NPA in out of the blue broad focus utterances. This is repeated in 84.

(84) What's up?
Partide Ali AYSE'YI optu.
at the party Ali Ayse.ACC kissed
At the party, Ali kissed Ayse.

When we change the direct object here to a distributive universal quantifier, the default position of the NPA shifts onto the verb.[35] This is illustrated in the examples in 85.

(85) a. (Ali)$_\Phi$ (partide)$_\Phi$ (her Anamurluyu)$_\Phi$ (OPTU)$_\Phi$.
Ali at the party each An.DEM.ACC kissed
At the party Ali kissed each person from Anamur.

b. # Ali partide her ANAMURLUYU optu.

c. # Ali partide HER Anamurluyu optu.

This is a puzzling fact. But, it can straightforwardly be accounted for by assuming that the object QP undergoes QR and vacates the stress domain, leaving the verb as the only stressable element there.

Now, we must rule out an objection that would go like this: "This kind of quantifier phrase is special in that it has to be treated as discourse-familiar. Discourse-familiarity leads to givenness, which leads to the observed shift in the position of the NPA." Despite its immediate plausibility, such an account runs into problems. In the following example, the direct object is explicitly marked as familiar. Yet, in an out of the blue utterance, the direct object must bear the NPA—the verb cannot.

(86) What's up?

[34] The material in this section has greatly benefited from Ömer Demirok and Kyle Johnson.

[35] That this particular quantifier is distributive can be seen by the unacceptability of the following example, which uses a collective predicate. A contrasting example with *tüm*, 'all,' which has a collective interpretation, is given as well.

(1) a. # Her Anamurlu toplandi.
each An.DEM gathered
#Each person from Anamur gathered.

b. Tüm Anamurlular toplandi.
all An.DEM.PL gathered
All the people from Anamur gathered.

a. Ali partide su gecen gunku ANAMURLUYU optu.
Ali at the party that last day.REL An.DEM.ACC kissed
At the party, Ali kissed that guy from Anamur from the other day.

b. # Ali partide su gecen gunku Anamurluyu OPTU.

Further research is required here to ascertain the fact that we are indeed dealing with the same phenomenon in 85 as in the account of the factivity alternation.[36]

An issue that might arise with the present proposal is that the link between the semantics and the prosody is mediated through the syntax. This means that for the phonology to 'see' the structural difference between factive and non-factive attitude reports, that difference must exist in the syntax. In addition, if Kahnemuyipour (and related) proposals are to be applied, the nominalization must escape the phase within which NPA assignment is calculated before it is spelled out. One could imagine a model of the grammar where the syntax delivers two representations for factive attitude reports:

(87) a. [SUBJ [$_{\text{AspP}}$ FP V]]
b. [SUBJ [FP [$_{\text{vP}}$ ___ V]]]

but where the former crashes at LF due to a type mismatch, while the latter survives.

A final worry would be string vacuous scrambling. We know that clauses and other constituent can be moved around in Turkish. Is there anything, then, that would prevent a parse like the following for *non*-factive attitude reports? Here, the representation is that of a nominalized clause that has vacated the stress domain via string vacuous movement. The nuclear stress assignment algorithm used up to now would predict that the verb should bear nuclear stress.

(88) [SUBJ [CP [$_{\text{vP}}$ ___ V]]]

This in turn predicts that attitude reports where the verb has the NPA could be uttered out of the blue, with broad focus. More specifically, it predicts that the following should be acceptable, which we have seen isn't:

(89) # Dilara Aybike'nin sigara ictigini DUSUNUYOR.
D. A. cigarette smoke.NMZ thinks
Dilara thinks that Aybike smokes cigarettes.

I believe that this can be ruled out by general economy conditions on movement à la **?**. Indeed, this movement step does not make a truth conditional change and might be blocked for that reason.

5.2. Hypothesis II: Presupposed to given

5.2.1. Background

Syntactic structure is known to be a factor that affects prosodic structure. A second (set of) factor(s) is what is called the 'information structural' status of the linguistic expressions of an utterance. While an out of the blue utterance of 90 will have the nuclear pitch accent

[36] Quantifiers that pattern like *her* include numerals (with the exception of *bir*, 'one/a'), *tüm*, 'all,' *çoğu*, 'most,' and *biçok*, 'many,' among perhaps others. One type of quantifier that does not pattern like *her* and retains the NPA is the existential *bir*.

on 'bats,' as in 90a, if the word 'bats' has been mentioned prior to the target utterance, it is deaccented. Then, the nuclear pitch accent shifts leftward, and falls on 'book,' as in 90b.

(90) Mary wrote a book about bats. Adapted from Selkirk [1996]

a. What's up?
Mary wrote a BOOK about BATS.

b. Bats are really interesting creatures... You know what?
Mary wrote a BOOK about bats.

In English, at least, the nuclear pitch accent is not the only one that is affected by information structural factors. While an additional pitch accent on 'book' is licensed in the all-new context in 90a, prior mention of the word makes it deaccented, as in 91.

(91) Books are really interesting things... And you know what?
Mary wrote a {book, *BOOK} about BATS.

Prior mention, as in 90b or 91, makes a linguistic expression 'given.' And given expressions are usually deaccented. This can be captured by a constraint along the lines of 92.

(92) Deaccent given!

The position of the nuclear pitch accent is sensitive to givenness in Turkish. While an out of the blue utterance of 93 has the NPA on the direct object, as in 93a, prior mention of 'Ayse' shifts the NPA rightward, to the verb, as in 93b.

(93) **Target utterance**:
Partide Ali Ayse'yi opmus.
at the party Ali Ayse kissed
At the party, Ali kissed Ayse.

a. **Utterance context**:
Partide n'olmus?
at the party what happened?
What happened at the party?

i. Partide Ali AYSE'yi opmus.

ii. # Partide Ali Ayse'yi OPMUS.

b. **Utterance context**:
Ali'yle Ayse bir partiye gitmis.
Ali.with Ayse a party.to went
Ali and Ayse went to a party.

i. # Partide Ali AYSE'yi opmus.

ii. Partide Ali Ayse'yi OPMUS.

It is unclear to me at this stage whether other pitch accents (or phrasing) are affected by givenness in Turkish. This is illustrated by the fact that the following sentence, where the subject and the object in the answer are accented and phrased regularly, is an acceptable answer to a question that makes the subject and the object discourse given.

(94) a. **Context**:
aNAmurlu aLANyaya gitMIS mi?
Anamur.DEM Alanya.DAT went Q
Did the person from Anamur go to Alanya?

b. **Target utterance**:
Evet. (aNAmurlu)$_{\Phi}$ (aLANyaya)$_{\Phi}$ (gitMIS$_{\Phi}$)
yes An.DEM Al.DAT went
Yes. The person from Anamur did go to Alanya.

It should suffice, at this stage, to note that the position of the nucleus is affected by givenness. This allows formulating hypotheses explaining the interaction between the factive inference and the position of the nucleus. The hypothesis in 95a links presupposition and givenness, stating that the former implies the other. And 95b links givenness and prosodic structure.

(95) a. **Hypothesis**: Presupposed to given
Presupposed material is treated as discourse-given.

b. **Hypothesis**: Given to deaccented
Discourse-given material repels the NPA.

Let us now see how this pair of hypotheses accounts for the data. The way that these hypotheses account for the observation that non-factive attitude reports have the NPA in the embedded clause and that factives have it on the matrix verb is straightforward.

5.2.2. Accounting for the data

Non-factives Indeed, in non-factive attitude reports, the embedded proposition is not presupposed. If the clause denoting the embedded material does not host material that is otherwise given, the NPA falls on the embedded clause. In out of the blue utterances, nothing is typically given—it is then natural to expect the NPA in its default position.

(96) Dilara Aybike'nin SIGARA ictigini dusunuyor.
D. A. cigarette smoke thinks
Dilara thinks that Aybike smokes cigarettes.

Now of course, this leads us to the expectation that if the embedded direct object is given, the NPA should travel away from this default position. We have seen some relevant examples in section 3.2.3. But these examples were confounded in that they also raised a question about the embedded constituent. This means that the effect of givenness, which is to repel the NPA, was potentially counteracted by the effect of answer focus, which is to attract it.

The following example controls against this. Prior mention of the direct object in the target attitude report makes it given, which is able to shift the NPA away from the direct object onto the embedded verb.

(97) a. **Context**:
Ali Ayse'yle partiye gitmis.
A. A.with to the party went
Ali went to the party with Ayse.

b. **Target**:
Can ise Ali'nin Ayse'yi$_G$ OPTUGUNU dusunuyormus.
Can as for A. A. kiss think
As for Can, he thinks that Ali KISSED Ayse. #...AYSE'YI...

Factives In factive attitude reports, the embedded proposition is presupposed. By 95a, we infer that the embedded clause is given. And by 95b, we infer that the embedded clause must be deaccented. This, in conjunction with regular NPA calculation mechanisms seen in section 5.1, derives the fact that in factive attitude reports, the matrix verb hosts the NPA.[37]

(98) Dilara Aybike'nin sigara ictigini BILIYOR.
D. A. cigarette smoke knows
Dilara knows that Aybike smokes cigarettes.

5.2.3. Discussion: The relation between givenness and presupposition

The explanation at hand crucially relies on the hypothesis that presupposed material is treated as discourse-given. Now, it is an empirical question whether there is a relation between givenness and presupposition. Logically, this relation could go one (or both) of two ways.

(99) a. Given to presupposed:
If a clause C is given, the denotation p of C is presupposed.
b. Presupposed to given:
If a proposition p is presupposed, a clause C that denotes p is given.

The empirical evidence against a principle like 99a is compelling. In 100, the lead in makes the content of the embedded clause 'John smokes' given. Yet, an utterance of 100 in this context does not presuppose that John smokes.

(100) It is possible that John smokes.
Mary denies that [John smokes]$_G$.

One might claim that presupposition, here, is precluded by the fact that the lead in raises an implicit question about whether John smokes and that in the absence of such a question, 'given to presupposed' might hold. This does not seem to be on the right track either, as shown by 101. What is intended is to utter 101 in an out of the blue context with the embedded clause deaccented. Take deaccenting here to reveal an effect of givenness. (One can mark certain items as given in out of the blue utterances to produce some effect.) Yet, 101 does not presuppose that John smokes.

(101) Out of the blue:
Mary THINKS that John smokes.

This, I believe, is grounds enough to dismiss 99a, that an inferential step from given to presupposed is licensed.

[37] How should the interaction between givenness and default accent placement be implemented? In a constraint based system, this could be achieved by ranking a constraing like DEACCENT GIVEN! higher than a faithfulness constraint that assigns violation marks to outputs where the NPA is positioned away from the position as calculated in the syntax. This set up would need to rule out a competitor to where the matrix subject is stressed, for example.

Let us now review some evidence and counter-evidence in favor of a principle like 99b, which formulates an inferential step from presupposed material to given.

Evidence: Presupposed → given Kallulli [2006] presents evidence that, under certain circumstances, verbs that are thought of as non-factive (like *believe*, German *glauben*, Albanian *besoj*) introduce factive attitude reports. Kallulli's observation is that the embedded clause in such reports is marked as given.

Her data include the following. In 102, from Albanian, the embedded clause may or may not be doubled by a clitic, 'e.' Doubling produces an interpretive difference: Without doubling, the attitude report is reported to be non-factive; With doubling, it is reported to be factive.

(102) (E) besova se Beni shkoi.
it believed.1s that Ben left

a. Without 'e': I believed that Ben left (✓but in fact he didn't).
b. With 'e': I believed it that Ben left (# but in fact he didn't).

[Kallulli, 2006, ex. 6]

Kallulli shows, independently, that a necessary and sufficient condition for clitic doubling in Albanian is that the clitic's 'associate' be discourse given (she does not mention whether contextual salience licenses clitic doubling as well).[38] When the clitic is expressed, then, its associate clause (*se beni shkoi*, above) is marked as given. In addition, the proposition expressed by that clause is presupposed.

Data are presented from English and German, which are similar to 102 in that a non-factive belief verb is composed with a pronoun in addition to a clause. An example is provided in 103.

(103) I didn't believe it that John left. #In fact he didn't.

[Kallulli, 2006, ex. 4, adapted]

In English, expressing the pleonastic pronoun is not necessary to generate presuppositional attitude reports with non-factive verbs. In 104, the pronoun is omitted. The belief report is reported to imply that John left.

(104) I didn't see John leave my party, but then he called me from his home phone. Now it was obvious. I believed that John left.

[Kallulli, 2006, ex. 15]

The description of these facts is supplemented by a prosodic analysis which seems to suggest that the complement clauses in 103 and 104 are deaccented. This is taken as an indication that the clauses are given. Taken at face value, these facts suggest that there is a correlation between the factive inference (generated in this way) and givenness.

[38] The evidence is as follows. When 'the book' is part of material that fills in a *wh-* word, it cannot be clitic-doubled. When 'the book' is given, it must be doubled.

(1) a. —What did Ana do?/What did Ana read? —She (*e_i) read the book$_i$.
b. —Who read the book?/What did Ana do with the book. —She *(e_i) read the book$_i$. [Kallulli, 2006, exx. 9–12]

Counter evidence: Presupposed $\not\rightarrow$ given Authors like Wagner [2012], Rochemont [2016] and Büring [2016] warn against collapsing givenness and presupposition. Example 105 shows that deaccenting a clause does not entail that the proposition that it denotes is presupposed.

(105) a. Contrary to the facts, they told Mary that the lake was too cold and it was impossible to swim in it.
   i. #She never believed that it was too COLD.
   ii. She never BELIEVED that it was too cold.
   [Wagner, 2012, ex. 13]

   b. (What if the Johnsons show up?) I DOUBT they'll show up.
   [Büring, 2016, ex. 6, p. 100]

Examples 106a, 106c and 106d show that it is not because a proposition has been presupposed that the clause that denotes it has to be deaccented, i.e., that presupposition does not entail deaccenting. Example 106b shows that presupposition is compatible with deaccenting, and that deaccenting is rather triggered by the *salience* of surrounding linguistic material (here, 'Although it was way too cold'), than its status wrt the common ground.

(106) a. Mary wanted to go swimming in the lake.
   i. She didn't realize that it was too COLD.
   ii. #She didn't REALIZE that it was too cold.
   [Wagner, 2012, ex. 11]

   b. Although it was way too cold, Mary wanted to go swimming in the lake.
   i. #She didn't realize that it was too COLD.
   ii. She didn't REALIZE that it was too cold.
   [Wagner, 2012, ex. 12]

   c. (Sorry we're late, there was a terrible blizzard on the way here.) Don't worry, I'm just glad you didn't run out of GAS.

   d. (The Burtletts don't want to see you.) Do they know my mother is a SEnator?
   [Büring, 2016, exx. 7–8, p. 101]

These data points strongly suggest that an inferential step from presupposed to given is not licensed.

Presupposed to given? If Kallulli's proposal is taken to be a general one, the data in 106a, 106c, and 106d are unexpected. Indeed, if those embedded clauses were marked as given by virtue of the fact that the embedded proposition is presupposed, they should be deaccented, contrary to observation.

Different conclusions can be drawn from this result. The first one is that an hypothesis like 'presupposed-to-given' is restricted to sentences of the form 'S believes it that p,' and does not apply to sentences with other presupposition triggers like 'realize, be glad,' or 'know.' An alternative one is that Kallulli's data suggest something different from what the author proposes, i.e., that presupposition trigges givenness. Perhaps, in her data, there is a coincidence between presupposition and givenness, not because the former causes the latter, but because a third factor causes both. Yet another alternative is that Kallulli's examples

with 'S believes it that p' are not presuppositional at all. Then, in the relevant examples, givenness would be observed without presupposition, which would remove the grounds for concluding that it is presupposition that leads to givenness.

There is a possibility that the examples provided by Wagner and Büring could be confounded in their own way. They involve negation, the word 'just,' or the question operator, which are all items that can associate with focus and that change the prosodic structure of an utterance. However, a closer look reveals that this is not a confounding factor here. Take 107, which is a positive version of 106a, which included negation. We see that the embedded clause can be accented, which suggests that negation is not the culprit drawing prominence on 'cold' in 106a.[39]

(107) Mary wanted to go swinning in the lake.
But she realized that it was too COLD.

Büring's example 106c contains an emotive factive 'be glad.' Some authors propose that the presupposition associated with an emotive factive of the form 'S is glad that p' is not the bare prejacent 'p,' but rather 'S believes that p' (see the discussion of [Abrusán, 2011b, ex. 41] and references therein). If this is correct, we do not expect to observe the effect of 'presupposed-to-given' with emotive factives, as the embedded proposition is not what is presupposed.

These remarks are intended to suggest that the validity of a principle that links presupposition and givenness does not seem to be settled, although it does seem like a simple inferential step from the former to the latter is not licensed in the general case.

I would like to conclude this section by making two comments.

First, it is possible that the effect of presupposition on givenness varies from language to language. If this is the case, and that Turkish is a language where presupposed material does count as discourse given, we should expect to find examples of presupposition different from the factive presupposition that trigger a similar shift in the position of the NPA.

The definite presupposition is not one such presupposition. In Turkish, it is the subject of certain unaccusatives ithat carries the NPA in out of the blue, broad focus utterances. Example 109b illustrates. When the subject is a possessive phrase, which triggers an existence presupposition, the NPA remains on the subject. A naive version of 'presupposed-to-given' leads to the expectation that the NPA should shift from the subject onto the verb.[40]

(108) **Context**:
N'aber?
What's up?

(109) **Targets**:
a. i. MUZAFFER geliyor.
ii. # Muzaffer GELIYOR.
M. is coming
Muzaffer is coming.

[39]The reason Wagner uses examples with negation is that he wants to make sure that the examples are presuppositional rather than, e.g., simply veridical.

[40]Note that 109b would suffice to make the point, in that proper names presuppose the existence of their denotations as well.

b. i. ANNEM geliyor.

ii. # Annem GELIYOR.
my mother is coming
My mother is coming.

On the other hand, there does seem to be a contrast between the prosodic structure associated with an utterance of 'S started doing X,' in 111a, compared with 'S stopped doing X,' in 111b. The contrast is this. An out of the blue, broad focus utterance of 'S started doing X' has the NPA in an embedded position. It is odd to produce the sentence with the NPA on the matrix verb. On the other hand, it is perfectly acceptable to utter 'S stopped doing X' with the NPA on the matrix verb. It is also acceptable to utter the sentence with the NPA on an embedded position—although my judgment fluctuates between a broad focus and a narrow focus interpretation. What is crucial, however, is the availability of a broad focus interpretation with matrix NPA.

(110) **Context**:
N'aber?
What's up?

(111) **Targets**:

a. i. Aybike SIGARA icmeye baslamis.

ii. # Aybike sigara icmeye BASLAMIS.
A. cigarette smoke start
Aybike started smoking cigarettes.

b. i. Aybike sigara icmeyi BIRAKMIS.

ii. Aybike SIGARA icmeyi birakmis.
A. cigarette smoke stop
Aybike stopped smoking cigarettes.

This contrast could be explained by a principle like 'presupposed-to-given' through the following observation. 'S started p' presupposes that p was false at a past time, i.e., $\exists t[t < \text{UT} \wedge \neg p(t)]$. To note here is that the presupposition contains the negation of the proposition denoted by the embedded clause. On the other hand 'S stopped p' presupposes that p was true at a past time, i.e., $\exists t[t < \text{UT} \wedge p(t)]$. That is, the polarity of the presupposition and the proposition denoted by the embedded clause are congruent. Perhaps, then, to observe the effects of 'presupposition-to-given,' one should look at those presuppositions that are, in some intuitive sense, 'spelled out' by the triggering utterance.

The second comment is this. The foregoing discussion was based on the observation that factive attitude reports have a special prosodic structure in that the embedded clause repels the NPA. This is not the full picture, however. When an attitude report like 112, where the matrix verb is *fark et-*, 'to notice,' is uttered in an out of the blue, broad focus context, the most natural position of the NPA is within the embedded clause. The attitude report is factive, in the sense, at least, that a speaker who utters 112 is committed to the truth of the embedded proposition.

(112) Aybike [Dilara'nin SIGARA ictigini] fark etti.
A. [D. cigarette smoke notice
Dilara noticed that Aybike smokes.

Other verbs that pattern like *fark et-* are verbs like *öğren-* ('learn'), *keşfet-* ('discover') and *farkına var-* ('notice,' formed on the same root as the verb in 112). The first underlying generalization here seems to be that these are eventive coming-to-know verbs. Such verbs assert something along the following lines: 'There is a time s.t. S did not know p prior to t and S knows p from t on.' The second underlying generalization seems to be that these attitude reports are not presuppositional in the same way as attitude reports introduced by 'know,' or 'forget,' are. The relevant difference is that it is perfectly acceptable to utter these attitude reports in contexts where the *hearer* is not opinionated as to its truth. That is, I can utter 112 (in Turkish, or English) in a context where you do not have prior knowledge that the embedded proposition is true.[41]

What is interesting is that shifting the NPA to the matrix verb is possible, but doing so commits the hearer to the truth of the embedded proposition as well. This is illustrated by the sentences in 113. To note here is that the fact that the hearer is committed to the truth of the embedded proposition licenses matrix NPA.

(113) John is in a hospital room waiting for test results.

a. i. **Context #1**:
John is not sick but he does not know this.

ii. **Context #2**:
John is not sick and he does know this. He had been faking all along.

b. A nurse walks in and says:

i. Doktor HASTA oldugunuzu fark etti. — OK in C1, OK in C2

ii. Doktor hasta oldugunuzu FARK etti. — # in C1, OK in C2
Doctor sick be.NMZ noticed
The doctor noticed that you were sick.

In context #2 (in contrast with context #1), the information is available that the patient (the hearer) is aware of the truth of the embedded proposition. The oddity of 113b-ii in context #1, but its acceptability in context #2 suggests that the hearer needs to 'be in on' the truth of the embedded proposition for the embedded clause to be felicitously treated as given.

6. Concluding remarks

In this paper, I have described data that suggest that there is an interaction, in Turkish, between the availability of the factive inference in an attitude report, and the prosodic structure of that report. While in non-factives the position of the NPA is the language default, in factives it falls on the matrix verb.

I have considered two hypotheses to account for this interaction. The first one was based on assigning factive and non-factive attitude reports a different syntactic structure.

[41] It is possible that the shift in the position of the NPA might be driven by stativity ('know') vs. eventivity ('notice'), where those factive verbs that are stative are the ones with the exceptional prosodic structure. This remains to be tested, but would fall in line with independent facts from the literature [Kratzer and Selkirk, 2007]. (Verbs like *unut-* 'forget' are eventive, and have matrix focus. The non-factive counterpart of *bil-* is stative, but has embedded focus.) An interesting point to note is that eventive factives do not seem to commit the hearer to the truth of the embedded proposition, while statives do.

In factives, the embedded clause was argued to undergo an operation similar to Quantifier Raising, which made it vacate the syntactic domain within which sentential stress was assigned. The verb remaining the only stressable word within that domain, it surfaced as the NPA bearer. No such movement was required for the interpretation of non-factives and it was the embedded clause, which remained within the stress domain, which hosted the NPA.

The second hypothesis was based on the possible existence of an inferential step going from the semantic property of being presupposed to the information structural property of being discourse-given. Discourse-given material repels the NPA. If, then, presupposed material can be considered as discourse-given, it is natural to expect it to repel the NPA.

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