Overt Quantifier Raising derives factivity and its prosody

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1. Introduction

- In Turkish, factive and non-factive attitude reports have different prosodic structures.[1]

  In addition, some attitude verbs occur both in factive and in non-factive attitude reports.

  bil-, 'know' alternates vs. *düşün-*, 'think' is always non-factive vs. *unut-*, 'forget' is always factive

  (1) **The 'Prosodic Factivity Alternation'**
      Context: I call you up and say. . .
      a. **Embedded Main Sentential Stress (MSS)**
         Dilara [Aybike'nin SİGARA iç-tiğ-in-i   ] bil-iyor.
         Dilara   Aybike.GEN cigarette smoke-NMZ-3S-ACC   know-PRES
         Dilara thinks that Aybike smokes.   **Embedded MSS: non-factive**
      b. **Matrix verb MSS**
         Dilara [Aybike'nin sigara   iç-tiğ-in-i   ] BİL-İYOR.
         Dilara   Aybike.GEN cigarette smoke-NMZ-3S-ACC   know-PRES
         Dilara knows that Aybike smokes.   **Matrix verb MSS: factive**

  Roughly, Main Sentential Stress is on the 'perceptually most prominent word' in the sentence, and an informational center. (I'll also refer to this word as the 'nucleus.')

- This is unlike in English, where attitude verbs seem to be lexically encode at least the factive entailment, and intonation does not seem to affect the availability of the inference in root declaratives. Projection is different [Beaver, 2010, Tonhauser, 2016, Djärv and Bacovcin, 2017, a.o].

  Some other languages do pattern like Turkish: At least Bangla (Ishani Guha, pc), Hungarian (Dóra Takács, Júlia Keresztes, pc) and Cypriot Greek [Djärv, 2017].

- **Questions**
  1. Data like 1 suggests that the factive inference is not encoded in the attitude verb. So how does it arise?
  2. Why does the availability of the inference vary with prosodic structure?

The proposal in a nutshell
- Turkish has a factive 'complementizer' F, absent in 1a and present in 1b.[2]
                                                    [Kratzer, 2006, Moulton, 2009, a.o.]
- The presence of F introduces a syntactic difference between factive and non-factive attitude reports.
  - The embedded clause remains in situ in non-factives.
  - The embedded clause raises in factives.
- Given a regular syntax to prosody mapping, the difference in syntax results in a difference in prosody.

Non-factives	**Factives**
Syntax: S [$_{vP}$ CP V]	Syntax: S [[CP F] [$_{vP}$ ___ V]]
Prosody mapping: (S) $\boxed{(CP_{MSS} \ V)}$	Prosody mapping: (S) (CP) $\boxed{(\_\_\_ \ V_{MSS})}$
Truth conditions: S believes p	Truth conditions: p and S believes p

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[1] I focus on attitude reports that are not embedded under any entailment canceling operators. So this talk is about generating the factive inference, rather than about projection. An attitude report is factive iff it implies the attitude proposition and that this implication is not cancelable (that is, an entailment or a presupposition).

[2] In previous work, I have tried to account for a different factivity alternation without using factive complementizers [Ozyildiz, 2017]. Further research is required to see if we can do away with them here too.

2. Empricial contribution

2.1. A factive and a non-factive semantic representation for alternating pairs

The sentence in 2 (repeated from 1) is associated with **two semantic representations**.

(2) Dilara [Aybike'nin sigara   iç-tiğ-in-i   ] bil-iyor.
   Dilara Aybike.GEN cigarette smoke-NMZ-3S-ACC   know.PRES
   Dilara {thinks, knows} that Aybike smokes.

- Evidence for the **availability of a non-factive representation**:

  (3) Sentence 2 followed by denial of embedded proposition:
      a.   Dilara Aybike'nin SİGARA içtiğini biliyor...   ["3a but 3c": Not contradictory]
      b. # Dilara Aybike'nin sigara içtiğini BİLİYOR...   ["3b but 3c": Contradictory]
      c.   ...ama Aybike sigara   iç-mi-yor.
            but Aybike cigarette smoke-NEG-PRES
            ...but Aybike doesn't smoke.

  > ⇒ If 3a can be followed by 3c, it has a semantic representation that neither entails nor semantically presupposes the embedded proposition.

- Evidence for the **availability of a factive representation**:
  - The judgment of contradiction in following up 3b with 3c.
  - Anti-presupposition
    In 4a: Sentence 2 is acceptable in a context where the embedded proposition is true.
    In 4b: Attitude reports introduced by *düşün-* sound odd.

    (4) Aybike SİGARA iç-iyor   ve...
        Aybike cigarette smoke-PRES and
        Aybike smokes and...
        a. ✓ Dilara [Aybike'nin sigara içtiğini] BİLİYOR.
              Dilara knows that Aybike smokes.
        b. # Dilara [Aybike'nin sigara içtiğini] DÜŞÜNÜYOR.
              # Dilara thinks that Aybike smokes.

  The contrast exists in English as well. Accounts rely on the existence of pairs of attitude reports s.t.
  - ∗ both members have contextually equivalent assertions (e.g., 'S knows p' and 'S thinks p'),
  - ∗ one member of the pair is presuppositional ('know').   [Percus, 2006, a.o.]

  Unless the explanation is rejected, we have to conclude that attitude reports introduced by *bil-* can be presuppositional (, ones introduced by *düşün-* cannot).
  - Projection: Inference that the embedded proposition is true is available even when *bil-* is negated, etc.

    (5) Dilara [Aybike'nin sigara   içtiğini   ] BİL-m-iyor.   ⤳ Aybike smokes.
       Dilara Aybike   cigarette smoke.NMZ   know-NEG-PRES
       Dilara doesn't know that Aybike smokes.

  Without entailment or semantic presupposition, no projection (cf. "S doesn't think that p").
- Pilot perception study[3]:
  Attitude reports with *bil-* + matrix verb prominence: 97% factive responses.
  Attitude reports with *bil-* + embedded prominence: 66% factive responses.

  > ⇒ 2/3b entails or presupposes the embedded proposition.

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[3]36 participants. Two sentences in two conditions each: Matrix verb prominence and embedded prominence. Asked to respond p or "it's possible that not p."

2.2. The prosody

- For transitives uttered in out of the blue contexts, MSS falls on the direct object. Matrix verb MSS is marked and gives rise to various conversational inferences:

  (6) Context: I call you up and say...

  a.   (Aybike)$_\Phi$ (SİGARA içiyor)$_\Phi$ broad focus
  A.   cigarette smokes
  Aybike smokes cigarettes.

  b. # (Aybike)$_\Phi$ (sigara)$_\Phi$ (İÇİYOR)$_\Phi$ narrow predicate focus or verum
  A.   cigarette smokes
  Aybike smokes cigarettes.
  ⤳ E.g., I'm following up on a previous conversation about whether Aybike smokes.

- Turkish intonation
  - H* pitch accents.
    H- phonological phrase (Φ) boundary at right edge.
    L% intonation phrase boundary at right edge.
  - The position of MSS is indicated by a number of cues:
    Pre-nuclear phonological phrase boundary, pitch accent followed by post-focal pitch compression.
    The head of the rightmost phonological phrase bears main sentential stress (CAPS).
  - There is within and across speaker variability, potentially linked to pragmatic effects (work in progress).
    The crucial piece of variation here is in the position of MSS.

- Attitude reports with *düşün-* are like 6. In particular, 7b requires QUD accommodation.

  (7) Context: I call you up and say...

  a.   Dilara [Aybike'nin SİGARA içtiğini] düşünuyor.
  Dilara   Aybike   cigarette smokes   thinks
  Dilara thinks that Aybike smokes.

  b. # Dilara [Aybike'nin sigara içtiğini] DÜŞÜNÜYOR.
  ⤳ E.g., we've wondered about whether she smokes before.

- Attitude reports with *bil-* + MF are not like 6: They are felicitous out of the blue (so long as the factive presupposition is satisfied or accommodated).

  (8) Context: I call you up and say...
  Dilara [Aybike'nin sigara   içtiğini] BİLİYOR.
  Dilara   Aybike   cigarette smokes   knows
  Dilara knows that Aybike smokes.
  ⤲ E.g., we've wondered about whether she smokes before.

- Not verum focus.

  (9) Dilara is sad because she {#does know, knows} that Aybike smokes.
  8 in this kind of context. This is unexpected if 8 necessarily involved verum focus.

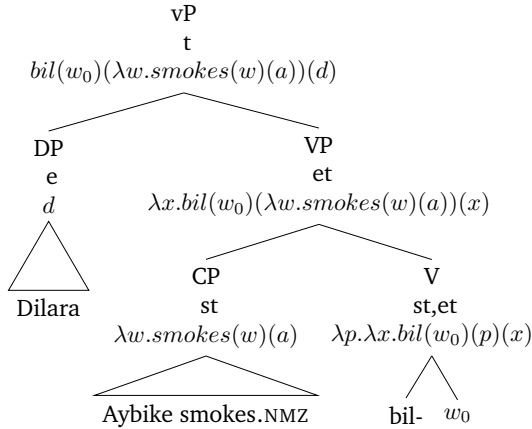## 3. Proposal I: Deriving a factive representation

General assumptions:

(10) a. Attitude verbs like *bil-* have a non-factive Hintikkan semantics:
$[\![\text{bil-}]\!] = \lambda w_s.\lambda p_{st}.\lambda x_e.\forall w'[w' \in DOX_{x,w} \rightarrow p(w')]$
All of the attitude holder x's alternatives w' to the evaluation world w are worlds where the proposition p is true.

    b. Nominalized clauses denote regular propositions:
$[\![\text{Aybike'nin sigara ictigi}]\!] = \lambda w_s.\text{Aybike smokes at } w$
The set of possible worlds w at which Aybike smokes.

3.1. Capturing the non-factive reading

The truth conditions of the non-factive reading (repeated below) come 'out of the box':

(1) a. Non-factive alternant
Dilara [Aybike'nin SİGARA iç-tiğ-in-i   ] bil-iyor.
Dilara   Aybike.GEN cigarette smoke-NMZ-3S-ACC   know-PRES
Dilara thinks that Aybike smokes.

(11) LF for the non-factive attitude report 1a

vP
t
$bil(w_0)(\lambda w.smokes(w)(a))(d)$

DP — e, d — Dilara

VP — et — $\lambda x.bil(w_0)(\lambda w.smokes(w)(a))(x)$

CP — st — $\lambda w.smokes(w)(a)$ — Aybike smokes.NMZ

V — st,et — $\lambda p.\lambda x.bil(w_0)(p)(x)$ — bil- w_0

$[\![vP]\!] = 1$ iff
Dilara believes Aybike smokes.

Because our definition of *bil-* is non-factive, the truth conditions for **??** do not entail the embedded proposition. (The LF is non-factive.)

3.2. Capturing the factive reading

An additional step is needed for the factive alternant:

(1) b. Factive alternant
Dilara [Aybike'nin sigara   iç-tiğ-in-i   ] BİL-İYOR.
Dilara   Aybike.GEN cigarette smoke-NMZ-3S-ACC   know-PRES
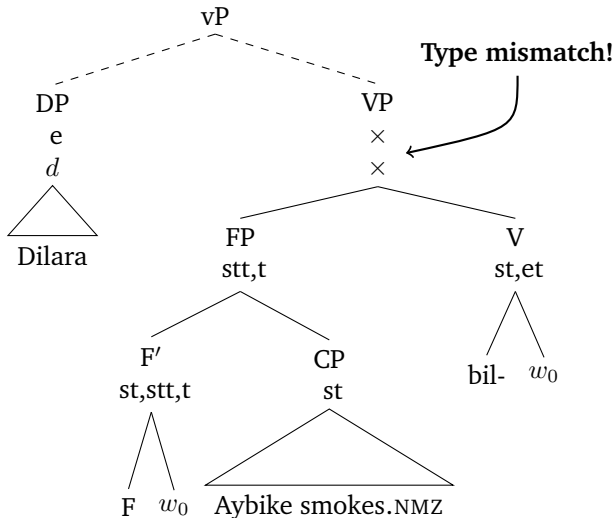Dilara knows that Aybike smokes.

Definition of F, a factive complementizer

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

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

F turns a non-factive report of the form 'S believes p' into the factive report 'p and S believes p.'

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(13)

vP

DP — e, d — Dilara

VP — × × **Type mismatch!**

FP — stt,t

V — st,et — bil- w_0
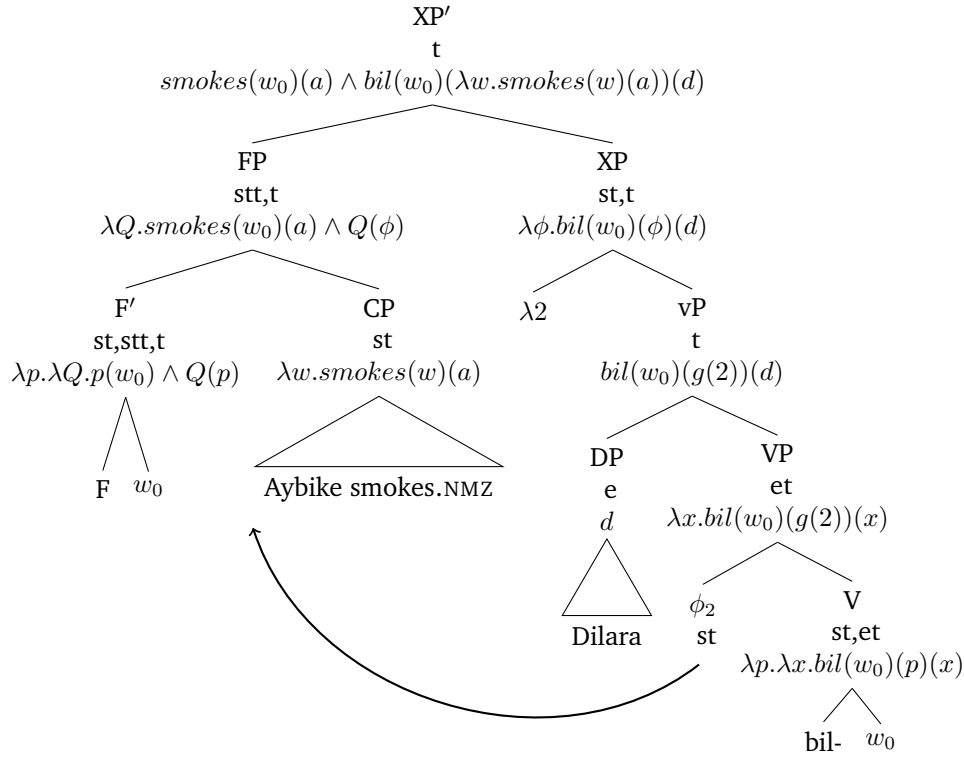
F′ — st,stt,t — F w_0

CP — st — Aybike smokes.NMZ

F composes with the embedded clause.

The resulting object is of type stt,t.

The attitude verb is looking for a proposition of type st.

The derivation cannot proceed.

4

The type mismatch is fixed by raising the FP.
In raising, the FP leaves a proposition-type trace. The attitude verb can compose with this object.

(14) LF for the factive attitude report in 1b

    a. Structure

$$\text{XP}'$$
$$t$$
$$smokes(w_0)(a) \wedge bil(w_0)(\lambda w.smokes(w)(a))(d)$$

FP
stt,t
$\lambda Q.smokes(w_0)(a) \wedge Q(\phi)$

XP
st,t
$\lambda\phi.bil(w_0)(\phi)(d)$

F′
st,stt,t
$\lambda p.\lambda Q.p(w_0) \wedge Q(p)$

CP
st
$\lambda w.smokes(w)(a)$

$\lambda 2$

vP
t
$bil(w_0)(g(2))(d)$

F w_0

Aybike smokes.NMZ

DP
e
d

Dilara

VP
et
$\lambda x.bil(w_0)(g(2))(x)$

ϕ_2
st

V
st,et
$\lambda p.\lambda x.bil(w_0)(p)(x)$

bil- w_0

    b. Truth conditions
        ⟦XP'⟧ = 1 iff Aybike smokes and Dilara believes that Aybike smokes.

Finally, the subject raises above the embedded clause.

(15) $\lambda 0$ Dilara $\lambda 3$ [Aybike smokes F] $\lambda 2$ x_3 ϕ_2 bil w_0

Because F asserts the proposition it composes with, the truth conditions of 1b entail the truth of the embedded proposition.[4]

3.3. Restricting the system: selection

- To capture the facts with non-alternating attitude reports, additional assumptions are required.
  This is a general 'drawback' associated with approaches that export the factive inference into the semantics of embedded clauses.
- Verbs that are always non-factive (e.g., *düşün-* 'think,' *san-* 'believe,' etc.) never select FPs.
  Verbs that are always factive always (e.g., *unut-* 'forget') always select FPs.
- Turkish has a second clause embedding strategy: Tensed clauses introduced by the morpheme *diye*.

  (16) Dilara [Aybike SİGARA içiyor diye] biliyor.
      D.   A.   cigarette smoke DIYE know
      Dilara believes that Aybike smokes.

      Infelicitous after "Dilara smokes and. . . " ⇒ no factive reading

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[4]Though the factive inference is encoded here as an entailment, it can be 'turned' into a presupposition using the algorithm described in Abrusán [2011]. Alternatively, instead of asserting the proposition it combines with, F could be defined to presuppose it.

- Attitude reports where the embedded clause is a *diye*-clause are never factive.
- Their intonation is the one expected for non-factives.
- This suggests that the head F is 'picky'—it only composes with nominalizations.

4. **Proposal II: The interface with prosody**

- **Background**:
  Syntactic structure determines prosodic structure (in part).

  - The highest item in v's spell out domain receives Main Sentential Stress.[5]

    [Legate, 2003, Kratzer and Selkirk, 2007, Kahnemuyipour, 2009, a.o.]

    (17) 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

  - Pre-nuclear constituents mapped onto prosodic constituents. [Kamali, 2011, İpek, 2015, Güneş, 2015]

    (18) ((Ali)$_\Phi$ (AYŞE'Yİ öptü)$_\Phi$)$_I$
         Ali kissed Ayşe

- **The prosodic structure of non-factives**:
  The nominalization remains within the stress domain. It gets accented.

  (19) Dilara [$_{vP}$ | [Aybike'nin [$_{vP}$ | SIGARA ictigini |]] biliyor |]
       Dilara   [Aybike'nin   SİGARA içtiğini   ] biliyor
       (   )$_\Phi$ (   )$_\Phi$ (   )$_\Phi$
       D.   A.   cigarette smoke.NMZ   knows
       Dilara believes that Aybike smokes cigarettes.

- **The prosodic structure of factives**:
  The nominalization merges with the head F. It raises and vacates the stress domain.

  (20) Dilara [$_{FP}$ [Aybike'nin sigara içtiğini] F] [$_{vP}$ | ___ BİLİYOR |]

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

  The verb is the only phonologically overt item within the domain, and gets accented.

- For this system to work, nominalized clauses must raise in the syntax.

5. **Discussion**

5.1. **Quantifier raising?**

- **Question raised by the present proposal**:
  Do other constituents undergo similar movement operations which affect prosodic structure, despite being string vacuous?

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[5]This assumes that we have an adequate representation about what items remain within that domain, and what items vacate it. I am not sure why MSS is not carried out of the phase here when the element that it gets assigned moves out.

- The data in 21 support this prediction:
  Observation: Not all direct objects are able to host MSS. In particular, some quantifier phrases do not.

  The all-new, broad focus utterance of example 21a has the NPA on the matrix verb. The direct object is introduced by a distributive universal quantifier phrase or by 'most.'

  (21) **Context**:

  A: Partide   neler   oldu?
     at the party what all happened?
     What all happened at the party?

  B: Can MUZİK açtı.   Pitır Ayşe'nin ŞARABINI içti.
     Can music opened Peter Ayşe.GEN wine.POSS wine drank
     Can played music. Peter drank Ayşe's wine.

  Target sentences:

  a. Alara HER/ÇOĞU davetliyi ÖPTÜ.   #Alara her DAVETLİYİ öptü.
     Alara every/most guest   kissed
     Alara kissed every guest/most of the guests.   [SMALL CAPS: Secondary locus of prominence]

  b. Alara bi DAVETLİYİ öptü.   #Alara bi davetliyi ÖPTÜ.
     Alara a guest   kissed
     Alara kissed a guest.

  c. Alara AYŞE'Yİ öptü.   #Alara Ayşe'yi ÖPTÜ.
     Alara Ayşe   kissed
     Alara kissed Ayşe.

- If it is assumed that QPs like 'every guest' or 'most of the guests' undergo overt QR, this exceptional-looking stress pattern can be explained with the same mechanism proposed for deriving the factive inference:

  (22) Structure for 21a
  [Alara [every guest [$_{vP}$ `___ KISSED`]]]

  On the other hand, names and indefinites do not need to QR.[6] They may stay in situ and host MSS.

  (23) Structures for 21b and 21c
  a. [$\exists_i$ Alara [$_{vP}$ `$f_i$(A GUEST) kissed`]]
  b. [Alara [$_{vP}$ `AYŞE kissed`]]

- **Upshot**: The effects of the mechanism that derives factivity and its interaction with prosodic structure are found elsewhere in the language.

5.2. Offending data

- The present proposal might be too strong.

  If there is a single way to factivity in Turkish, which is via the factive complementizer F, I make the prediction that all factive attitude reports should have the same intonation.

- Contrary to fact:

  In certain attitude reports, main sentential stress may remain within the embedded clause:

  (24) a. Ali neden üzgün?
         Ali why   sad.COP.3S
         Why is Ali sad?

  b. [Eski sevgili-sin-i   ÇOK özlediğini] {fark et-ti,   hatırla-dı}.
       old girlfriend-POSS-ACC a lot miss.NMZ realize-PST.PFV remember-PST.PFV
       He {realized, remembered} that he misses his ex a lot.

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[6]It's possible to force names into QR by conjoining them with QPs. Further research.

c. [Eski sevgili-sin-i   çok özlediğini] {FARK ET-Tİ,   HATIRLA-DI}.
    old   girlfriend-POSS-ACC a lot miss.NMZ   realize-PST.PFV remember-PST.PFV
    He {realized, remembered} that he misses his ex a lot.

- Is there optionality in which contour is used with certain factive attitude reports? Does it matter that the matrix predicate is eventive in 24?
- Is there a 'pragmatic' (rather than syntactic) link between presupposition and prosody? How to make this work?   [Kallulli, 2006, Wagner, 2012, Rochemont, 2016, Büring, 2016]

6. Concluding remarks

- Prosodic factivity alternation.
- Structural difference between factives and non-factives feeds into prosody.
- Limits.

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