Marking Prosodic Prominence in Turkish

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Current Study

- About:
  - Prosody of phrasal prominence in Turkish.
About:

- Prosody of phrasal prominence in Turkish.
  - Prosody of phrasal prominence will be described in the Auto-segmental metrical (AM) model of intonational phonology
Intonation in the AM Framework

- **Pitch-accents**: pitch targets over a stressed syllable
- **Boundary tones**
**Intonation in the AM Framework**

- **Pitch-accents:** pitch targets over a stressed syllable

- **Boundary tones:** pitch targets at the right/left edge of a prosodic phrase
Phrasal Prominence

- Head-prominence
- Head/Edge prominence
- Edge-prominence

Prosodic Typology (Jun 2005, 2014)
Head-Prominence:
- Head = lexically specified head (e.g. stressed syllable)
- Prominence is marked by the head of a phrase (e.g. pitch accent)
  - E.g. English, Spanish

Edge-Prominence:
- Edge = beginning or end of a prosodic unit (where the unit has no lexically specified head)
- Prominence is marked by tones at the edge(s) of a prosodic unit
  - E.g. Korean, Mongolian
Prosodic Typology (Jun 2005, 2014)

- Head/Edge-Prominence:
  - Prominence is marked by both the head and the edge of a phrase.
  - E.g. Bengali, Georgian
Where does Turkish belong to in the prosodic typology of languages in terms of phrasal prominence type?

- ki.táp  “a book”
- ki.tap.lár  “books”
- ki.tap.lar.ím  “my books”
- ki.tap.lar.ım.dá  “in my books”
- A.lán.ya  “name of a city in Turkey”
- oy.ná.ma.dı  “s/he didn’t play”
Turkish Sentence Prominence

- Subject  Object  Verb
Turkish Sentence Prominence

![Pitch (Hz) vs Time (s) diagram]

[People of Alanya] [the monkey looking for] Kan 2009
Intonational Phonology of Turkish (Ipek & Jun 2013)

Intonation Phrase (IP)

Intermediate Phrase (ip)

Prosodic Word (pw)
Intonational Phonology of Turkish (Ipek & Jun 2013)

Intonation Phrase (IP)

Intermediate Phrase (ip)

Prosodic Word L[σ σ σ (σ)]
Intonational Phonology of Turkish (Ipek & Jun 2013)

Intonation Phrase (IP)

Intermediate Phrase (pw  pw)

Prosodic Word $L[\sigma \sigma \sigma (\sigma)]$
Intonational Phonology of Turkish (Ipek & Jun 2013)

Intonation Phrase (ip  ip)

Intermediate Phrase (pw  pw)

Prosodic Word [σ σ (σ)]

H*
Sample Pitch Track

(!H*) limanDA görMÜŞ

leman’s son.POSS metin.ACC at the harbor see.PAST

(Ipek & Jun 2013)
Tonal Properties of Nuclear Word in Turkish (NPA)

- Pitch range of NPA is substantially compressed
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- Pitch range of NPA is substantially compressed

Any other tonal cues to mark nuclear word?
**Immediately Prenuclear Accent**

![Waveform and F0 graph]

<table>
<thead>
<tr>
<th>L</th>
<th>H*-</th>
<th>L</th>
<th>H*n</th>
<th>L</th>
<th>!H*</th>
<th>L</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leman</td>
<td>Mineyi</td>
<td><strong>limana</strong></td>
<td>yönlendirdi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leman</td>
<td>Mine.acc</td>
<td>harbor.dat</td>
<td>direct.past</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Time (s): 1.631
Kan (2009)
Kamalı (2011)

The employees should direct those who get overheated to the one with lemon.
Ipek & Jun (2013)
Claim

- $H^*$-
  - Marking prosodic grouping (ip)

- $H^*n$
  - Marking prominence of a following word
Question

- Are H*- and H*n phonetically realized the same?
Postpositional phrase + Subject + Verb

- For example: A friend arrived.

Postpositional phrase Subject Verb

- For example: Dogs bark.

Turkish also distinguishes these two meanings by the location of nuclear pitch accent (Ipek & Zubizarreta, in progress; cf. Untak-Tarhan 2006, Kan 2009)

- For the eventive statements, Subject receives nuclear accent.
- For the categorical statements, Verb receives nuclear accent.
The Study—Design

H^n

[Akşama doğru] [balıklar yandı] -- Group 1

evening    towards  fish.plu    burnt

“Towards the evening the fish burnt.”

H^-n

[Akşama doğru] [bebekler] [uyur] -- Group 2

evening    towards  babies    sleep

“Towards the evening babies sleep.”
Group 1 – PP_S_V

<table>
<thead>
<tr>
<th>akşama</th>
<th>doğru</th>
<th>balıklar</th>
<th>yandı</th>
</tr>
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<tbody>
<tr>
<td>evening</td>
<td>towards</td>
<td>fish</td>
<td>burnt</td>
</tr>
</tbody>
</table>

Time (s)

0       1.751
Group 2 – PP S V

Time (s) 1.715

F0 (Hz)

<table>
<thead>
<tr>
<th>L</th>
<th>H*</th>
<th>L</th>
<th>H*⁻</th>
<th>L</th>
<th>H*ⁿ</th>
<th>L</th>
<th>H*⁺</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>aksamə</td>
<td>doğru</td>
<td>bebekler</td>
<td>uyur</td>
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</table>
The Study--Materials

- 10 Target items
  - 5 Group1 + 5 Group2
- 15 Fillers
The Study--Data Collection

- Participants
  - 5 Turkish native speakers (2 males, 3 females)

- Data
  - 2 Groups × 5 Sentences × 5 Speakers × 5 Repetitions = 250 Sentences
Pseudo-randomized sentences presented on a computer screen one at a time.

Subjects read each sentence on their own pace.

The readings were recorded in a quiet room using Praat.
The Study -- Measurement

- F0 maximum, F0 minimum
The Study-- Analysis

- $f_{0\text{max}}$ (semitone)
- $f_{0\text{min}}$ (semitone)

- Statistical Analysis: Mixed Effect Models
  - Fixed factor: tone type
  - Random factors: sentence, speaker
The Result

Peak $f_0$ (semitone)

- $H^*-\cdot$
- $H^*n$

* indicates a significant difference.
H*n is phonetically realized higher than H*-. 

This suggests that H*n is not the same as high tone marking prosodic grouping, H*-. 

Turkish nuclear word is marked by a pitch accent (!H*) as well as a high tone marking the left edge of a nuclear word (H*n)
Nuclear word in Turkish is marked by both the head of a phrase, i.e., by a pitch accent realized on the stressed syllable of the nuclear word, and by high tone at the left edge of the nuclear word. Therefore, Turkish belongs to the category “head/edge” prominence language.


