Downstep in Japanese

Pitch register after an accented phrase is noticeably lower than after an unaccented phrase e.g., [1], [2], [3]

Domain
- Intonational Phrase (IP)/Major Phrase (MP) e.g., [4], [5]
- Maximal projections of syntactic categories (XPs) [6]
  → Proposal: Left edges of XPs are mapped onto left edges of MP boundaries that block downstep. (cf. Variation [7])
- Parts of speech [8]
  Downstep ✓ [N-nō [N-nō N]] but X [Adj [Adj N]]
  → Proposal: Relative clauses, mapped onto MPs, block downstep, as adjectives project RCs [9] but nouns don’t do so in Japanese.

Our study: Hypothesis
Relative clause boundaries block downstep.

Predictions
If RC boundaries block downstep, targets would not be downstepped in (1a, b) but would be downstepped in (2a, b).

(1a) [+RC], Adj. cond.: [[Verb-past]RC [Adj-past]RC [Noun]NP to itta
  ‘My’ brother said a grandchild who stared disfavourably and was tired.’

(1b) [+RC], Verb cond.: [[Verb-past]RC [Verb-past]RC [Noun]NP to itta
  ‘My’ brother said a grandchild who got adjusted themselves and stared disfavourably.’

(2a) [-RC], Adj. cond.: [[Noun]NP to itta
  ‘My’ brother said a grandchild who was tired.’

(2b) [-RC], Verb cond.: [[Noun]NP to itta
  ‘My’ brother said a grandchild who studied and was sleepy.’

Presence of downstep:

Peaks f0 in targets in accented phrases (e.g., 1a)
> Peaks f0 in targets in unaccented phrases (3a)

Results

Downstep is found in all conditions. RC boundaries per se do not block downstep.

<table>
<thead>
<tr>
<th>Type</th>
<th>/phoneme</th>
<th>t</th>
<th>p</th>
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<tbody>
<tr>
<td>(1a) V-A-N</td>
<td>(intercept)</td>
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<td>15.12</td>
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<td>(2a) Subj-A</td>
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</table>

Means for 10 speakers -


Discussion I
Why do attributive adjectives block downstep [8] while adj. in RC, verbs, and nouns [8] don’t?

- Attributive modifiers occur in a certain order in Japanese (as well) [10].
- The order was respected in [N-nō [N-nō N]] but not in [Adj [Adj N]] in [8]. The unnaturalness in meaning in the sequence A-A raised the pitch at the second A, blocking downstep.
- A/V in relative clauses don’t participate in this natural ordering constraint, as they are not attributive modifiers; they are in fact in the predicate position in RCs.

Discussion II
Definition of downstep
Is the pattern in A really the same as in V?

- In syntagmatic diagnostic of downstep [6], where the target is analyzed as downstepped if the f0 peak is lower than the peak in the trigger, downstep patterns don’t appear to be the same between A and V conditions.
- In fact, the presence of downstep in RC-Adj (1a) seems to be due to the high f0 in target in unaccented sentences.

Recording & Analysis
- 16 sentences in total
- 10 speakers (M: 1, F: 9), 8 repetitions
- Measurements: Max f0 of each phrase
- Linear mixed-effects analyses with R and lme4Test package; speaker and item as random effects

References

[This research is supported by JSPS KAKENHI grant #15K16751 to the 1st author.]