Japanese Downstep Revisited

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Introduction

Downstep in Japanese

Pater (1984), Pierrehumbert and Beckman (1988), Kubozono (1993), among others:

- Downstep is triggered by HPL lexical pitch accents (i.e., only accented words trigger Downstep).
- Major Phrase (MaP) is in the domain of Downstep.

(1) (Selkirk and Tateishi, 1991, 515 (16))

a. Downstep (i): Within a Major Phrase, introduce Downstep (i.e., lower the pitch register) after the first accent.

b. Register Resetting (ii): At the beginning of a Major Phrase, reset the pitch register.

Syntactic Boundary Blocks Downstep


Focus Blocks Downstep


(3) MaP rephrasing by Focus (Nagahara, 1994, p. 42)

a. Focus-left-edge (Pierrehumbert and Beckman, 1988)

Left edge of focus = left [MaP] edge

b. Focus-to-end

No intervening [MaP] boundary between any focus constituent and the end of sentence.

(4) No Focus (= default MaP phrasing)

Focus on an enigmatic "sister-in-law" or "sister-in-law's" wine with a wineglass.

Finding 1: No Complete Reset by Boundary/Focus

(5) a. ±Accent, ±Focus, ±Boundary (Left): control condition

"[Naomi/N4oya-no ane/´ ani-ga] [ (I) drank Naomi's big sister's/Naoya's big brother's wine with a wineglass."

b. ±Accent, ±Focus, ±Boundary (Center): testing the focus effect

"[Naomi/N4oya-no ane/´ ani-ga] [ (I) drank Naomi's big sister's/Naoya's big brother's what] did you drink it, with a wineglass?"

c. ±Accent, ±Focus, ±Boundary (Right): testing the boundary effect

"[Naomi/N4oya-no ane/´ ani-ga] [ (I) drank Naomi's big sister's/Naoya's big brother's wine with a wineglass."

Questions

1. Does a syntactic boundary or a focus really block Downstep?
2. Does focus behave exactly like a syntactic boundary?

Experiment

The experiment stimuli are constructed with the following 3 factors (2 × 2 × 2 design, 8 conditions):

1. Accent on N(oun)1/N2 (Naomi-no ane/Naoya-no ane)
2. Focus on N3 (wine 'wine' vs. nani 'what')
3. Syntactic boundary between N2 and N3 (N1 N2 N3) vs. [N1 N2] [N3]

Stimuli

- Subjects & Recordings: 11 subjects (5 females and 6 males); using 6 sets of 8 conditions; recordings 3 times for each subject
- Data normalization: Actual values in each subject’s data are converted to normalized values relative to the reference points (R1, R2) according to the following formula (Truckenbrodt, 2004):
  
  \[ \text{normalized value} = \frac{\text{original value} - R_1}{R_2 - R_1} \]

The following two values are calculated for each subject as the reference points (R1, R2):

\[ R_1 = \text{Mean value of F}_0 \text{-peak of N1} \]

\[ R_2 = \text{Mean value of F}_0 \text{-peak after N3} \]

Method

- Subjects & Recordings: 11 subjects (5 females and 6 males); using 6 sets of 8 conditions; recordings 3 times for each subject
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Finding 2: Syntactic Boundary ≠ Focus

- Focus (dotted lines) only affects the F0-peak of the focused phase (N3)
- Syntactic boundary (thick lines), on the other hand, affects various elements.
  a. F0-rise of N3 in [+Accent] conditions
  b. Ft-dip at the boundary between N2 and N3 in [-Accent] conditions
  c. Lowering of N2 in [+Acc] conditions

Discussion

- Downstep is only partially reset by syntactic boundaries and focus.
  - 2 domains of Downstep (within a Major Phrase and between Major Phrases)
  - Recursive models (e.g., Ladis, 1996; Först and Truckenbrodt, 2005) seem to be on the right track.
  - Focus and syntactic boundary behave differently.

- Major Phrase is derived purely by syntax.
  - Focus effect is independent of Major Phrase structure, independently affecting pitch register of the focused phrase and the post-focal material (Ishihara, 2007)

References


