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Effects of word order and embedded clause boundary on intonation in Tokyo Japanese

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Summary

- A production experiment examining the prosodic realization of syntactic embedded clauses in Tokyo Japanese, specifically testing the effects of word order optionality and sentence parsing. The results show:
  - No effect of word order on the prosodic realization of clauses.
  - Speakers' awareness of syntactic structure affects the prosodic realization of clause boundaries.

Background & Research Questions

Japanese allows word order alternation and center-embedded subclauses.

- It is difficult to detect where the embedded clause starts during sentence processing (see (2) and (3) below).
- Prosodic marking of embedded clause (left) boundaries would facilitate the incremental processing of the sentence structure.

However, syntactic embedded clauses often fail to map to intonational phrases, despite the syntax–prosody mapping principle MatchClause (Selkirk 2011: 452).

- Are embedded clause boundaries prosodically marked in Japanese?
- Does word order affect prosody?
- Does speakers' awareness of syntactic structure affect prosody?

Methodology & Stimuli

- Stimulus sentences all contain 1 DAT-, 2 NOM-, and 1 ACC-phrases.
- Nine speakers (6F, 3M), 2 items per condition (288 tokens in total)

Factors (2×2×2×2)

- SENTENCE.TYPE (DAT-embedded (1)/(2) vs. DAT-matrix (3)/(4))
- WORD.ORDER (NOM–DAT (1)/(3) vs. DAT–NOM (2)/(4))
- (Lexical pitch) ACCENT (NPs are all accented vs. all unaccented)
- READING.STYLE (prepared vs. unprepared reading)
  - Prepared reading: read the sentence silently to parse it before reading it aloud for the recording
  - Unprepared reading: start reading aloud as soon as the sentence appears on the computer screen

(1) DAT-embedded, NOM–DAT order

Manabu-ga [***Naomi-ga Yurie-ni*** *meeru-o okutta to*] *omotteiru yoodesu*
M.-NOM N.-NOM Y.-DAT mail-ACC sent that think seem
'Manabu seems to believe that Naomi sent a mail to Yurie.'

(2) DAT-embedded, DAT–NOM order

Manabu-ga [***Yurie-ni Naomi-ga*** *meeru-o okutta to*] *omotteiru yoodesu*
M.-NOM Y.-DAT N.-NOM mail-ACC sent that think seem

(3) DAT-matrix, NOM–DAT order

Manabu-ga Yurie-ni [*Naomi-ga meeru-o nakusita to*] *iitukemasita*
M.-NOM Y.-DAT N.-NOM mail-ACC lost that told
'Manabu told Yurie that Naomi lost the mail.'

(4) DAT-matrix, DAT–NOM order

Yurie-ni Manabu-ga [*Naomi-ga meeru-o nakusita to*] *iitukemasita*
Y.-DAT M.-NOM N.-NOM mail-ACC lost that told

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Results

Word Order (1) vs. (2) / (3) vs. (4)

- No sig. effects on the F0-rises at NP1, NP2, NP3.

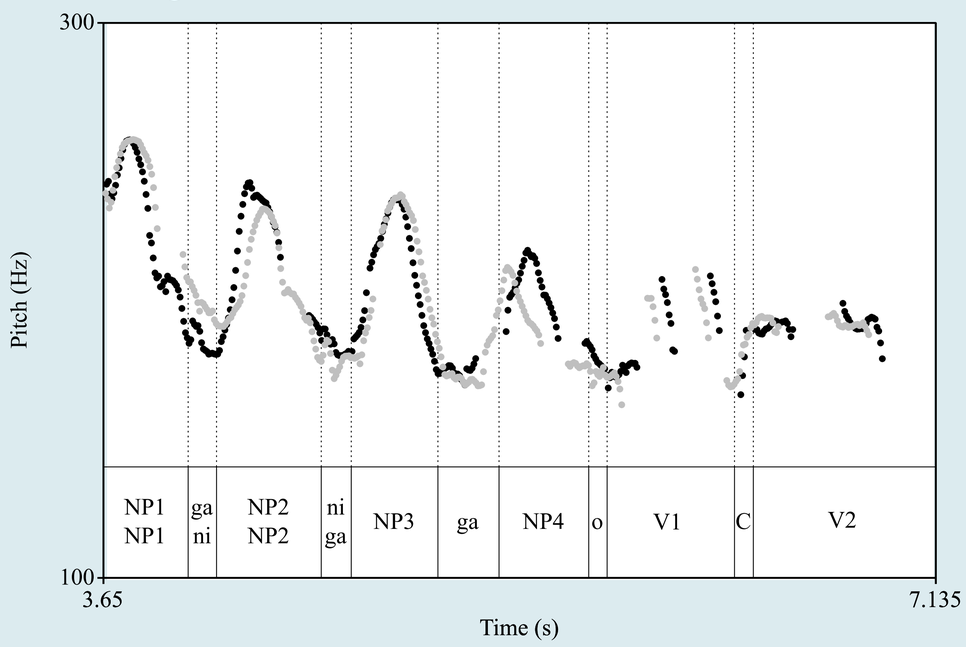

Fig. 1: Sample contours of DAT-matrix sentences, with NOM–DAT order (black) and DAT–NOM order (gray)

Clause Boundary (2) vs. (3)

- NP2: Larger F0-rise on Clause-initial DAT (2) than Clause-medial DAT (3)
- NP3: No sig. difference b/w Clause-medial NOM (2) and Clause-initial NOM (3)

Parsing (unprepared vs. prepared reading)

- In prepared reading, F0-maxima at clause boundaries were higher. (N.B. F0-rises, n.s.)
  - NP2 in (1)/(2) (see Fig. 2) and NP3 in (3)/(4)

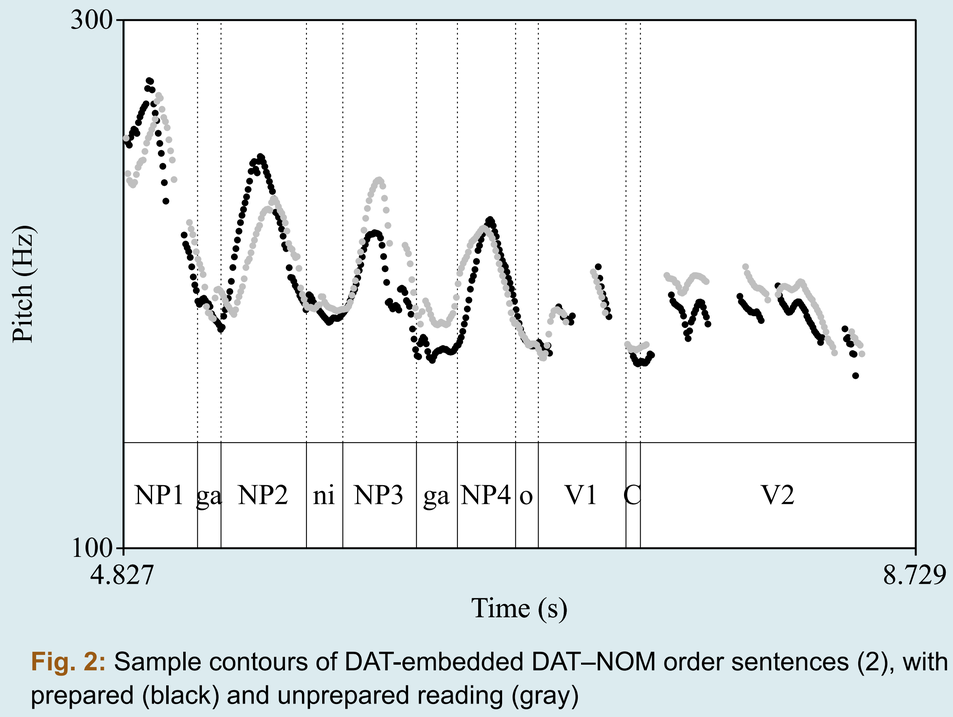

Fig. 2: Sample contours of DAT-embedded DAT–NOM order sentences (2), with prepared (black) and unprepared reading (gray)

Discussion

- Results are in line with previous findings on the lack of word order effect in sentence parsing (e.g., Yamashita 1997).
- Data from unprepared reading may be reflecting *implicit prosody* (Fodor 1998, Hirose 2003).
  - The high F0-max on *NP3-ga* in Fig. 2 suggests that NOM-phrases are used as a default clause boundary in unprepared reading (Miyamoto 2002).
  - This default high F0-max on NOM may explain the lack of a clause boundary effect on NP3.