

Rhythmic Boost and Recursive Minor Phrase in Japanese

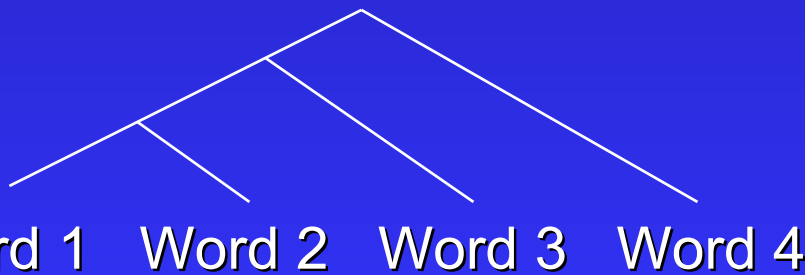
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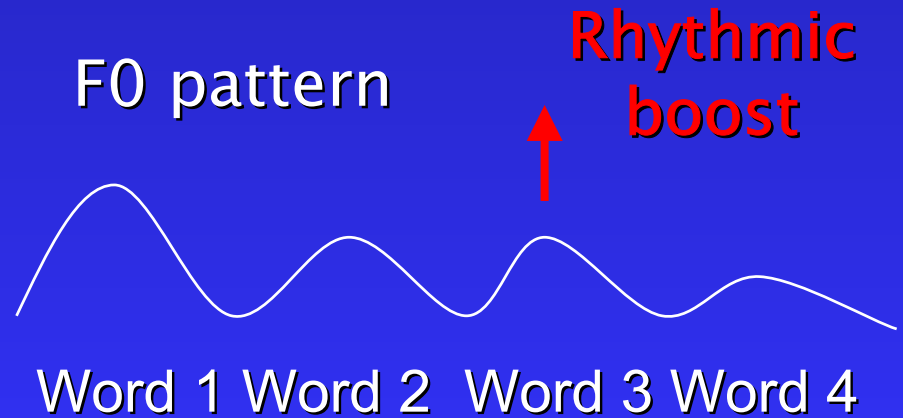
Rhythmic Boost

In a four accented word sequence with uniformly left-branching (LB) syntactic structure, no catathesis is seen on Word 3 (at least at an observational level). The F0 peak of the third word is realized as high as or higher than the peak of Word 2

Syntax



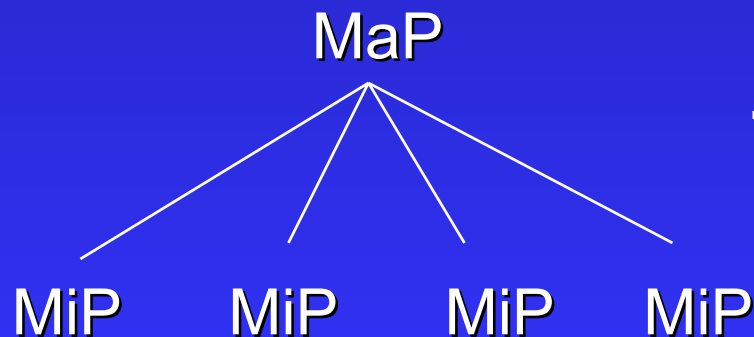
F0 pattern



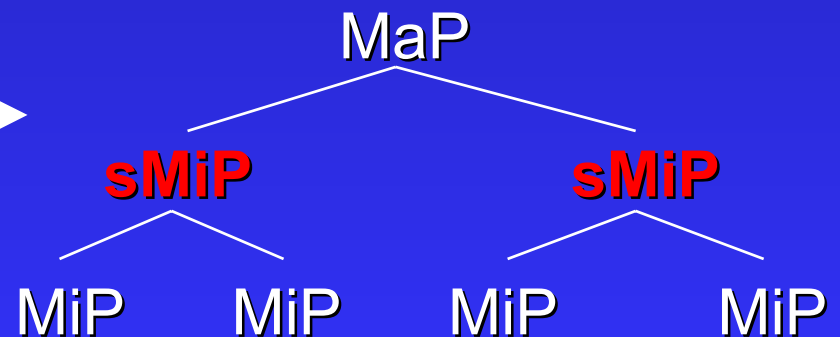
Kubozono's Recursive MiP

Kubozono (1989, 1993) proposes that the F0 boost on Word 3 in a LB four accented sequence is the consequence of the prosodic “restructuring” of the accented Word 3 and Word 4 into a **superordinate MiP (sMiP)**.

Before restructuring



After restructuring



Kubozono's Recursive MiP

- ◆ The restructuring is caused by **Principle of Rhythmic Alternation** whereby a four MiP sequence is changed into a binary sMiP–sMiP sequence, giving a recursive MiP structure (cf. Ladd 1986).
- ◆ A phonetic implementation rule raises the F0 at the left edge of a branching prosodic structure. An F0 boost therefore appears at the left edge of the second sMiP structure in the restructured representation coinciding with the left edge of Word 3.

MaP instead of sMiP ?

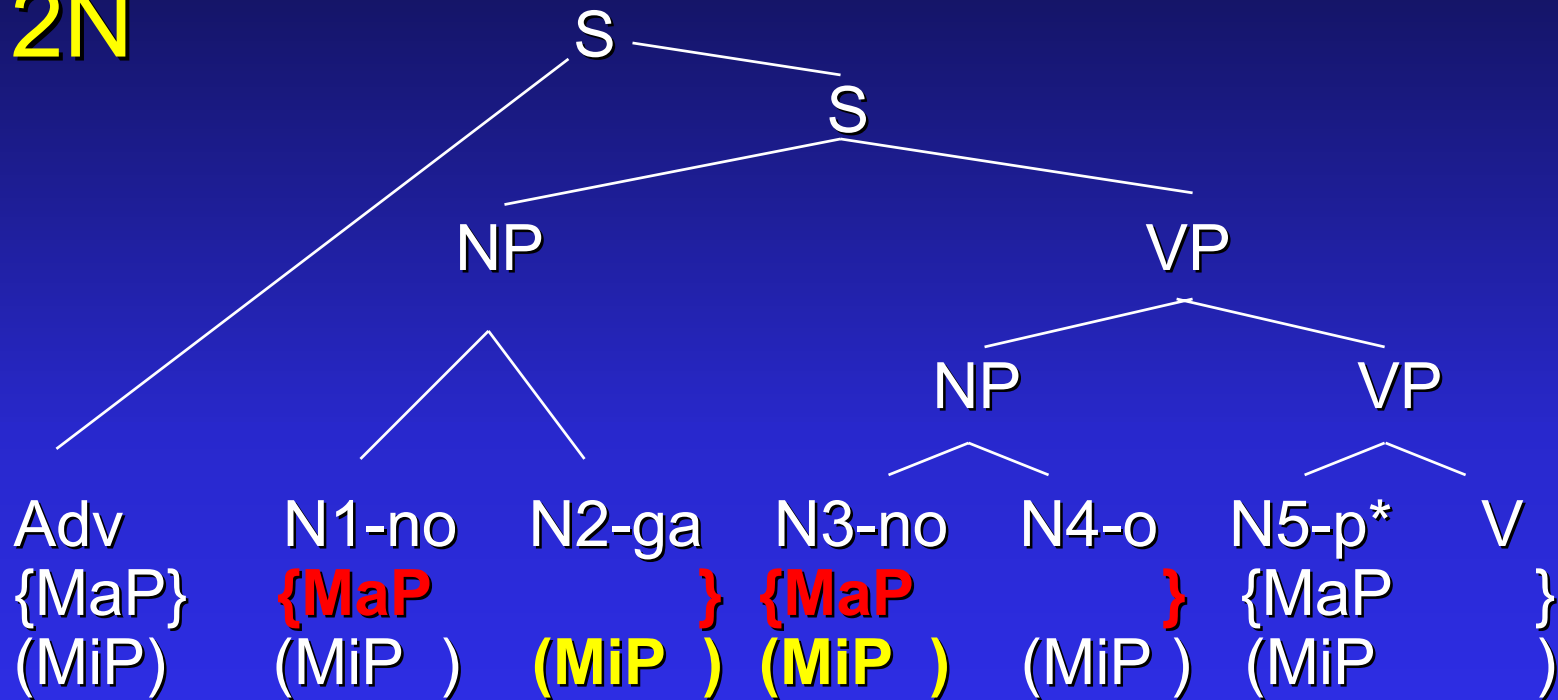
- ◆ Since there is no downtrend between Word 2 and Word 3, could the F0 boost be accounted for by a pitch-range reset at the left edge of a MaP ?

Anticipatory length-based (ALR) raising on sMiP ?

- ◆ Selkirk et al. (2004): A mora-counting ALR at the MiP level whereby longer MiPs exhibit greater initial rise and higher peak F0 values.
- ◆ Given the recursive MiP structure, it is hypothesized that the F0 peak values of Word 3 in LB four accented sequences are higher than those of Word 3 in LB three accented sequences because the second sMiPs in four accented sequences contain two words (hence more moras) than the third simplex MiP in three accented sequences.

Sentence structure

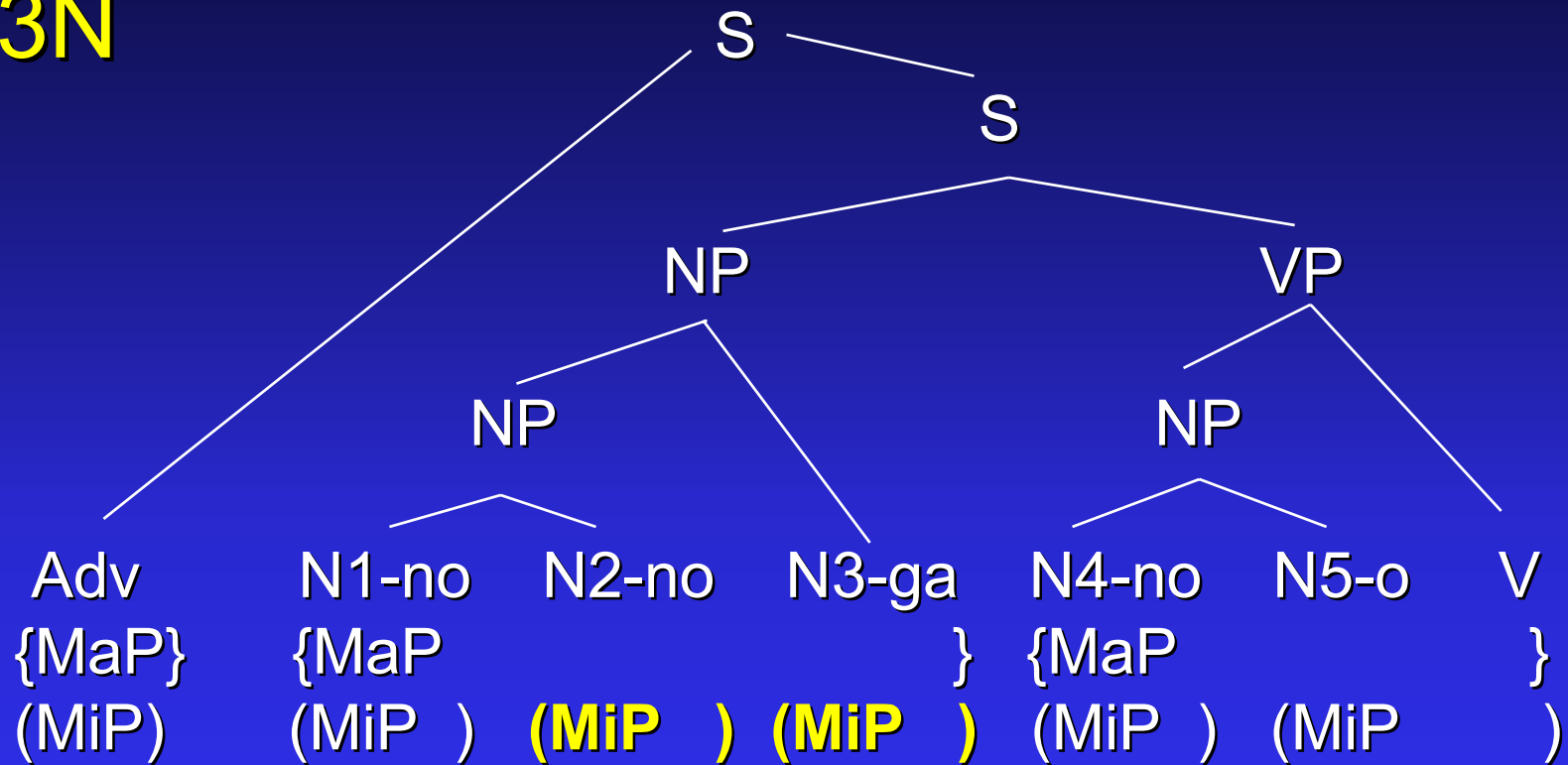
2N



* Postposition is indicated by a “p”. 7

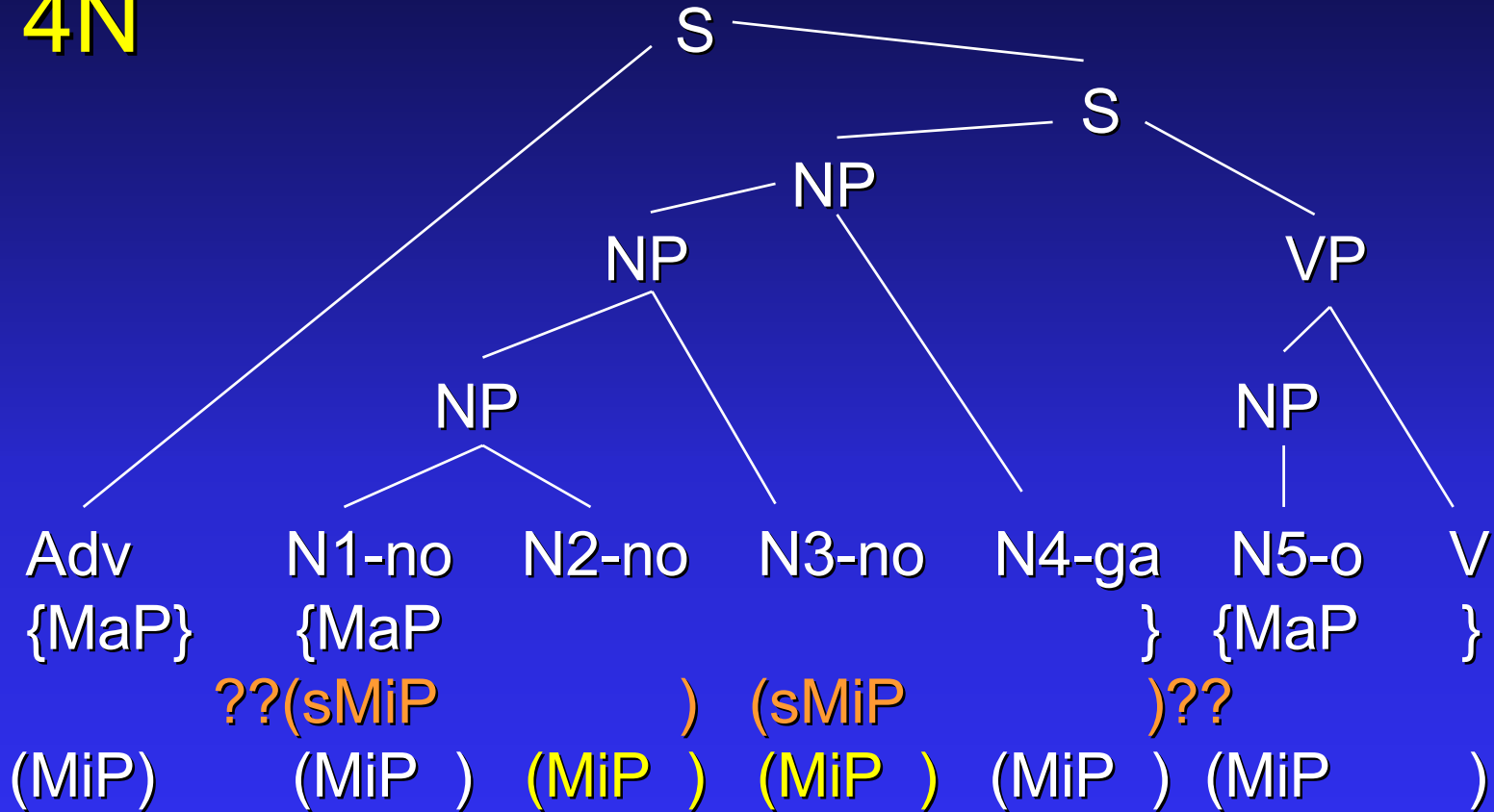
Sentence structure

3N



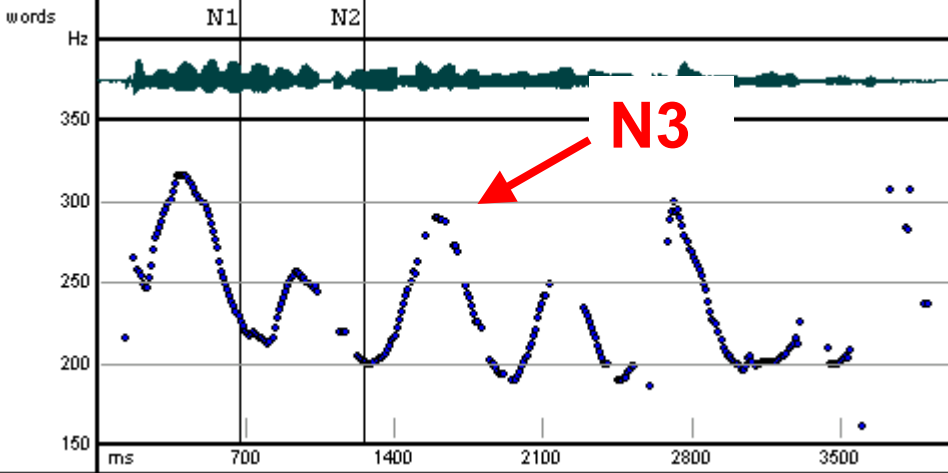
Sentence structure

4N



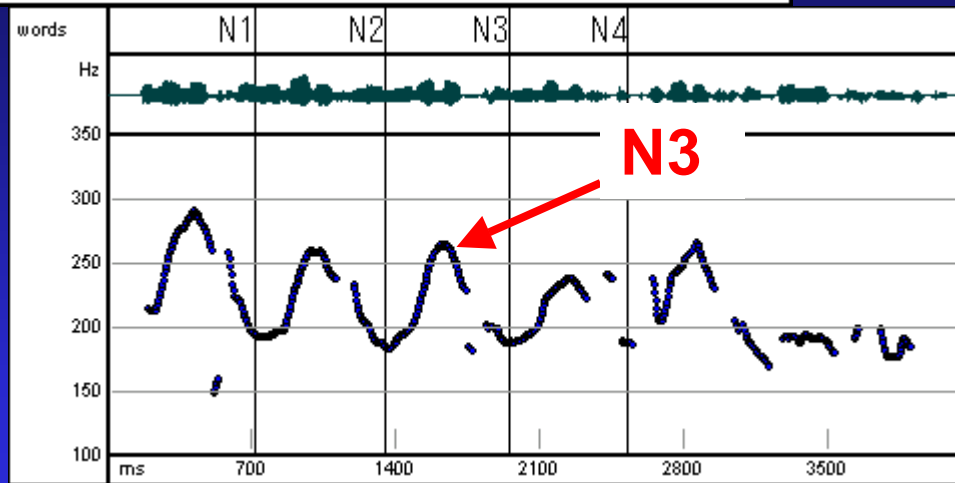
Materials & procedure

- ◆ All nouns consisted of 5 CV moras with lexical accent on the second mora
- ◆ Each sentence began with a sentence adverb
- ◆ Target sentences were in narratives consisting of two to three sentences
- ◆ Read by 3 female native speakers of Tokyo Japanese
- ◆ Measures for comparison: (1) the amount of initial rise at the left edge of the third nouns (**H3-L3**) and (2) that of the descent from the second to third nouns (**H2-H3**).



2 N

“Tominaga’s maki-rolls made Yamamori’s sister-in-law grunt with admiration first.”

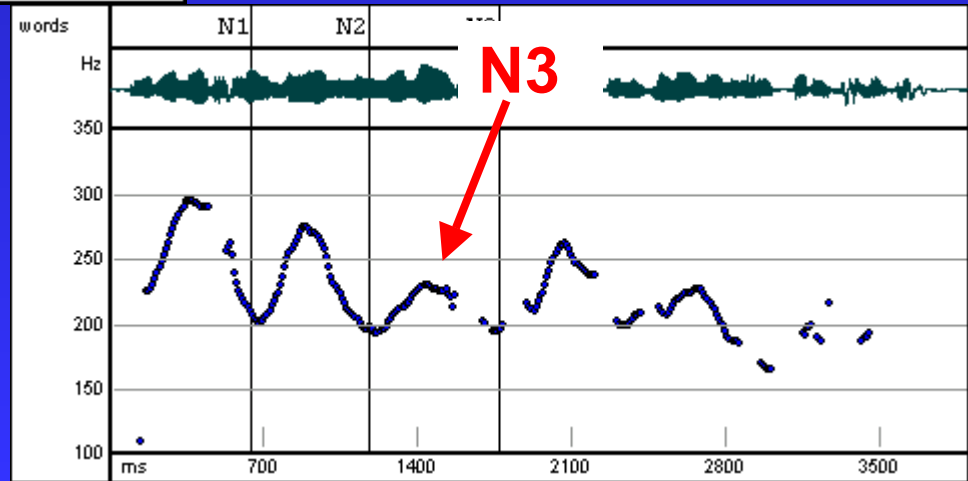


4 N

“The bagworms of the itinerant priest’s black pine trees in Ume town all died out by a cold wind.”

3 N

“The prearrangements of the policeman in Yamanashi made the fisherman in Hamanaka mad.”



Results

◆H3-L3 (initial rise):

$$2N > 4N > 3N$$

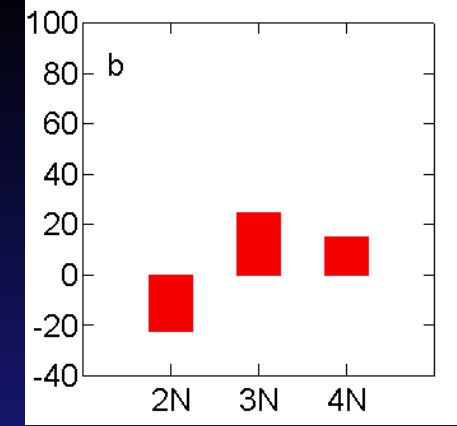
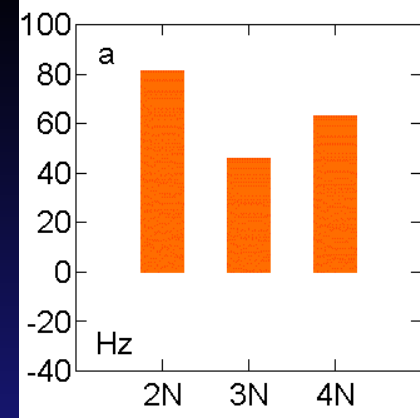
4N is significantly smaller than 2N and significantly greater than 3N for all speakers ($p = .002 \sim < .0001$)

◆H2-H3 (descent):

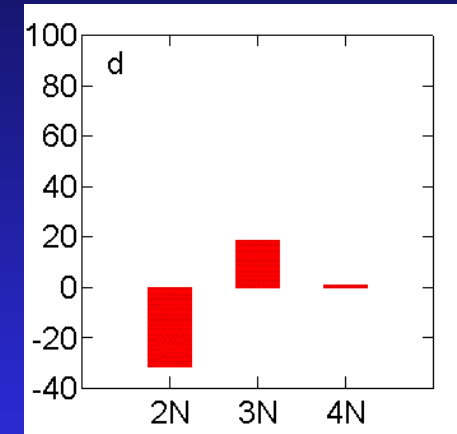
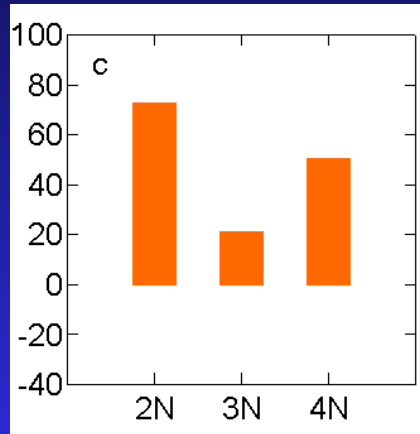
$$3N > 4N > 2N$$

4N is significantly smaller than 3N and significantly greater than 2N for all of the comparisons ($p < .0001$) but two (4N vs 3N of S2 & S3)

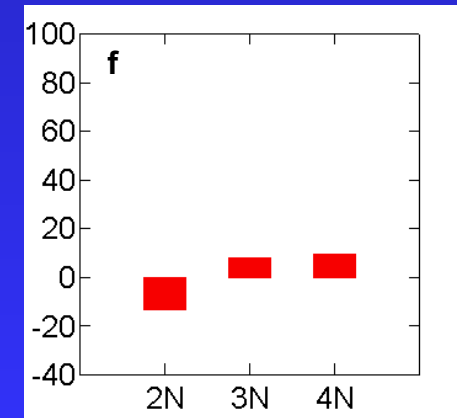
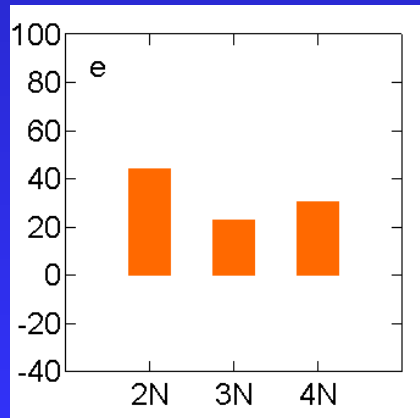
S1



S2



S3



H3-L3 (initial rise)

H2-H3(descent)

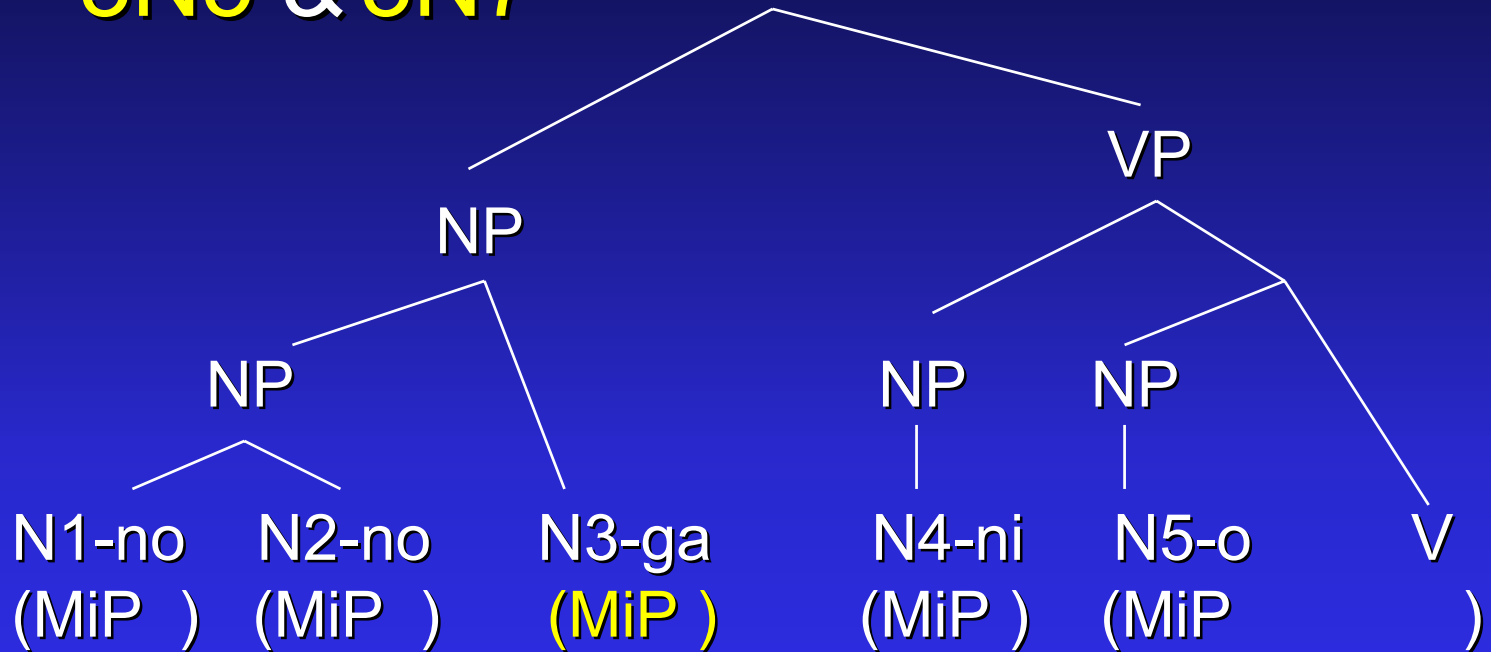
Introduction

The ALR Hypothesis:

The F0 boost at Word 3 in four accented sequences occurs because Word 3 and Word 4 form a sMiP and the greater length of that sMiP gives rise to a length-based anticipatory F0 raising effect.

Sentence structure

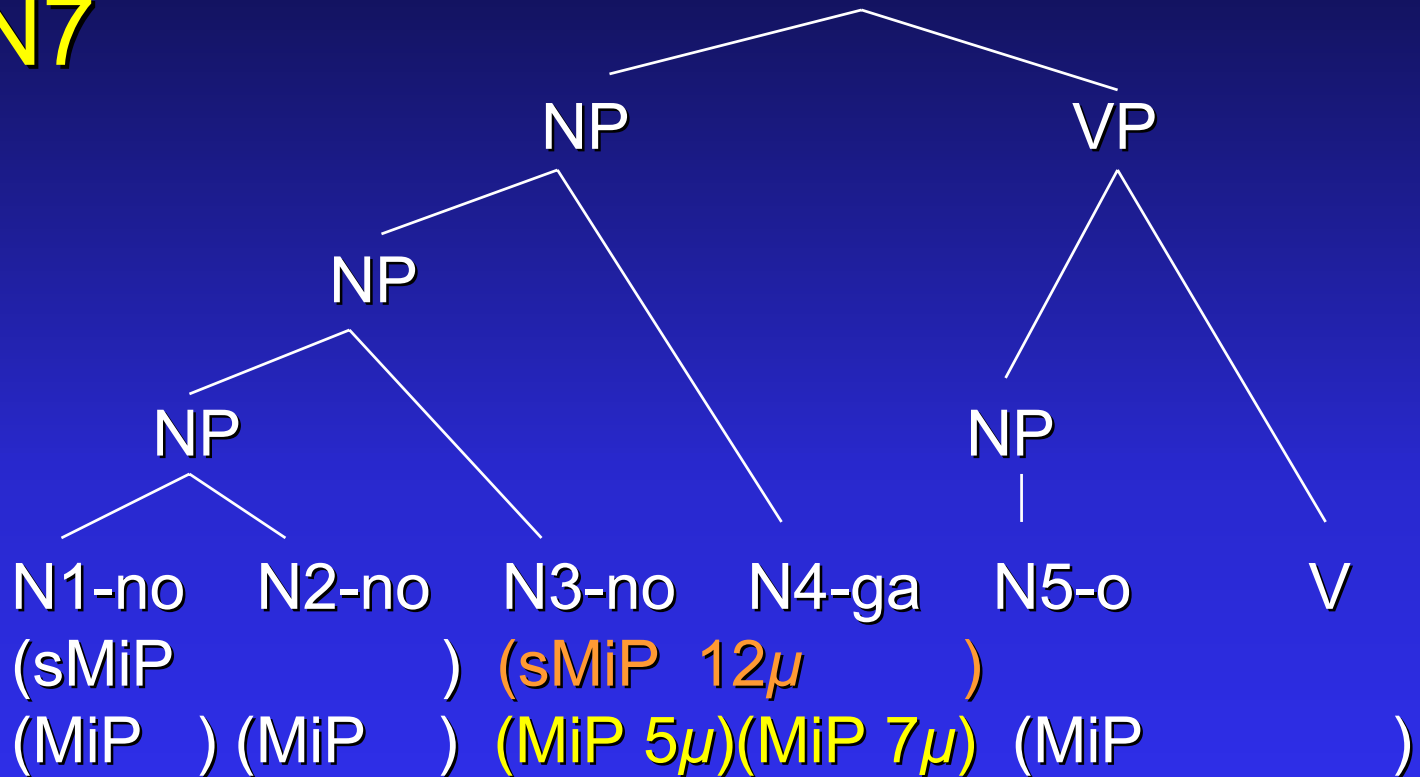
3N5 & 3N7



5 μ or 7 μ

Sentence structure

4N7



Predictions

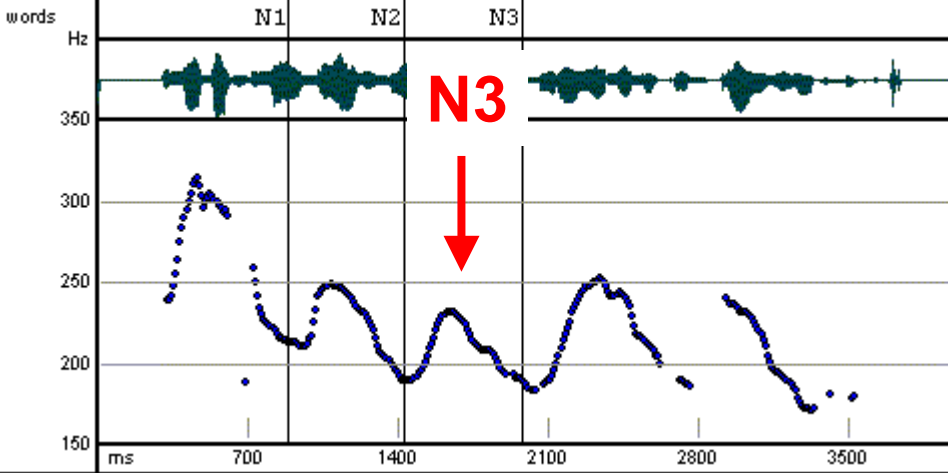
If ALR effect is what is at play,

- i. The F0 rises at the beginning of the third noun in the 3N7 cases should be greater than those in the 3N5 cases.
- ii. The F0 rises at the beginning of the third noun in the 4N7 cases should be much higher than those appearing in the 3N7 cases.

Materials & procedure

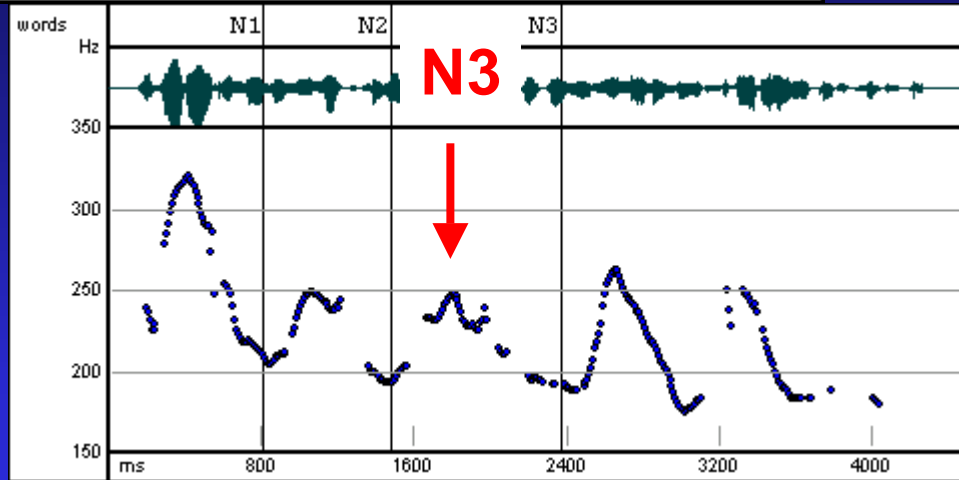
The procedures were identical to Experiment 1 except that:

- ◆ The target sentences were not in narratives
- ◆ Two speakers



3N5

“The police officer’s daughter-in-law in Funabashi gave the wild leopard cat sea bream.”

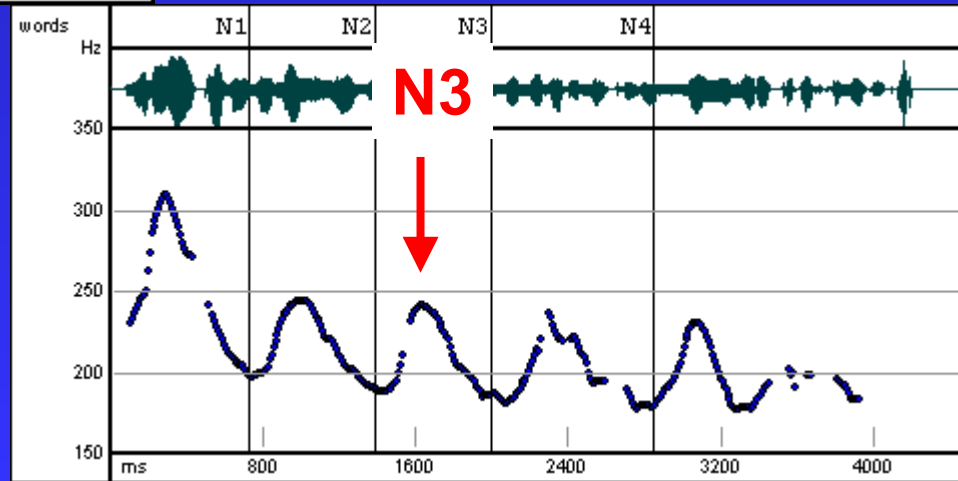


3N7

“The young stepmother in Nomi town in Ibaraki prefecture handed an oshibori towel to Yonemori.”

4N7

“The spring rolls of the daughter-in-law in Morioka pleased all.”



Results

◆ H3-L3 (initial rise):

3N7 > 3N5

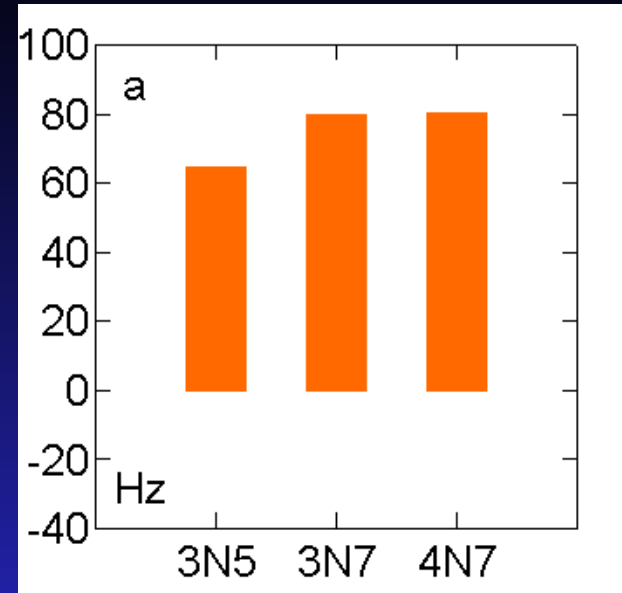
4N7 > 3N5

F0 rise in 3N7 and 4N7 cases were both significantly higher than the 3N5 case ($p = .003 \sim < .0001$)

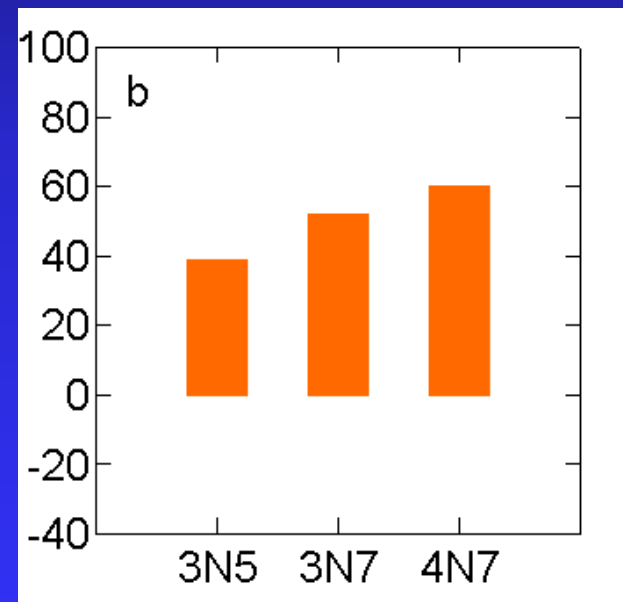
3N7 = 4N7

No significant difference between the F0 values of the third noun in the 3N7 and 4N7 cases ($p < .99$ & $p = .044$)

S1



S2



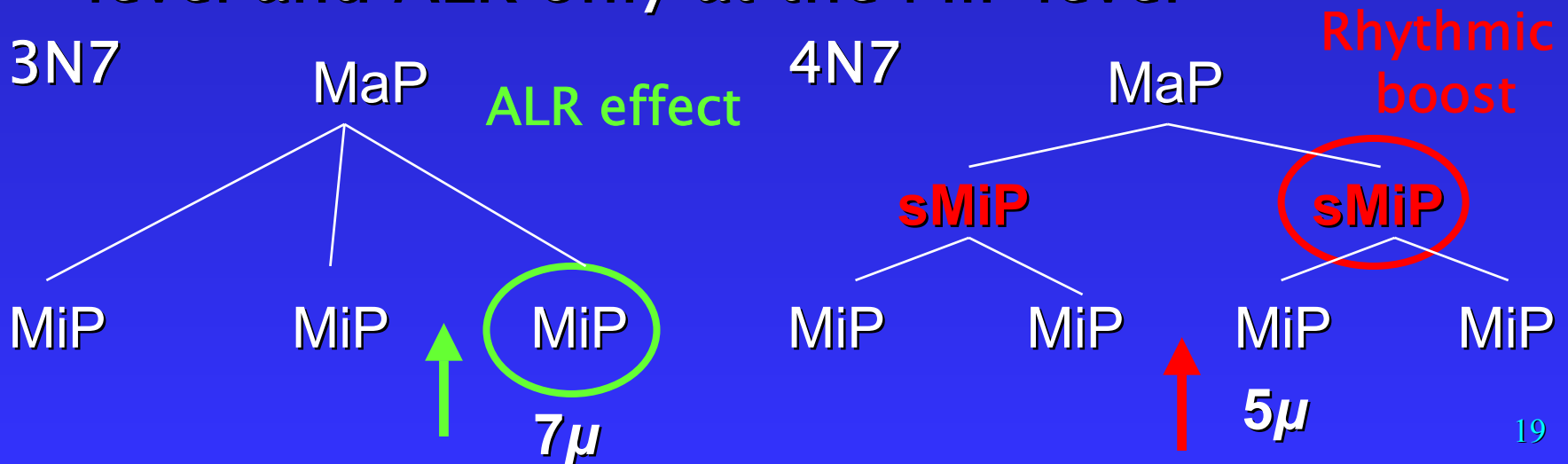
H3-L3 (initial rise)

Discussion

◆ Apparently contradictory results:

- ◆ Initial rise for the third noun in 3N7 was significantly greater than that in 3N5 → **ALR effect**
- ◆ No significant difference in initial rise between 3N7 and 4N7 → **No ALR effect**

◆ Rhythmic boost may operate only at the sMiP level and ALR only at the MiP level



◆ Experiment 1

- ◆ The F0 values for the third noun in LB four accented sequences are higher than those for the third noun in three accented sequences, and also lower than those for a noun that is at the left edge of a MaP.
- ◆ Further evidence for Kubozono's recursive MiP structure.

◆ Experiment 2

- ◆ Selkirk's et al.'s ALR effect is replicated.
- ◆ Rhythmic boost may operate only on sMiPs and ALR only on simplex MiPs.
- ◆ The magnitude of the F0 rise at the third noun in four accented sequences is not explained by ALR only. We are left with a theory in which both rhythmic boost and ALR are at play.

References

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