

Pitch, Speech Rate, and Syntax: Word-Initial Low in Japanese

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Japanese unaccented words have low pitch on the initial mora and high pitch on the rest of the word in their isolated forms as shown in (1). Previous analyses claim that word-initial low pitch turns into high when it immediately follows word-final high pitch in the same Minor Phrase as shown in (2) (Selkirk and Tateishi 1988). We show that this is oversimplification.

Data taken from recording of native speakers and analyzed with Praat show that word-initial low pitch does not become as high as the pitch of the following mora, and that pitch height changes according to speech rate and the length of constituents. In other words, low pitch does not change into high pitch completely as previous analyses imply. The phonological change must be analyzed not as an either-or process but as a gradable one.

The fact that word-initial low pitch is gradable cannot be explained by previous analyses because they only discuss application/non-application of phonological rules such as voicing and lengthening (e.g. Selkirk 1984, Cho 1990, Nespor and Vogel 1986, Inkelas and Zec 1995).

Our data show: (i) the faster the utterance is, the higher is the initial mora (e.g. (3)); (ii) the more the syntactic boundaries between the word and the preceding word are, the lower is the initial mora (e.g. (4)). However, speech rate has been neglected by previous analyses.

We will present an analysis that nicely handles gradable processes such as Japanese word-initial pitch change. We assume that syntactic structure represented with brackets showing constituents (e.g. (5a)) is mapped onto phonological words with boundaries between them (e.g. (5b)). We propose a boundary deletion rule: Delete n boundaries between words (n : a natural number). We assume that the variable n relates to speech rate. The larger the value of n is, the faster is the speech as shown in (6). The number of boundaries between words corresponds to no pitch assimilation, some assimilation, and complete assimilation to the preceding high pitch.

Moreover, the analysis presented here correctly predicts that word-initial low pitch does not change into high easily when there are syntactic boundaries between words ((7a) vs. (7b)).

In sum, word-initial low pitch in Japanese is gradable depending on speech rate and syntactic brackets, which needs a new analysis such as the one we present here.

Examples

- (1) a. amai 'sweet'
L HH
- b. momo 'peach'
L H
- (2) amai momo 'sweet peaches'
LHH L H -> LHH HH
- (3) amai momo 'sweet peach'
LHH L H -> LHH LH(slow)/MH(mid)/HH(fast)
- (4) [[amai momo-to] nira] 'sweet peaches and leeks'
L HH LH H L H -> LHH HHH LH
- (5) a. [[amai] [momo]] 'sweet peach'
b. // amai // momo //
- (6) a. // amai // momo // (n=0: slow)
b. / amai / momo / (n=1: mid)
c. amai momo (n=2: fast)
- (7) a. [amai momo] 'sweet peach'
LHH L H -> LHH HH
- b. [[amai momo-to] nira] 'sweet peaches and leeks'
L HH L H H LH -> LHH HHH LH

References

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