Variable Pitch Accent and Prosodic Phrasing in Japanese Adjectival Complex DPs

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**Background**  The variable pitch accent of adjectives in Tokyo Japanese has been well documented in literature [1-3], whereby there is an increasing trend of accented realizations (accentuation) of unaccented adjectives becoming more acceptable. In particular, such accentuation is more acceptable at the phrase-final position than when directly modifying a following noun. These patterns suggest that pitch accent is sensitive to prosodic phrasing. Though much has been discussed about how prosodic phrasing triggers the phonetic realization of pitch accents, i.e. pitch reset and downstep [4,5], less has been discussed about how prosodic phrasing modifies the underlying pitch accent of a lexical item itself, or whether a certain pitch accent combination would result in a particular prosodic phrasing. In this study, we investigate whether the variable nature of pitch accent in adjectives allows for an interaction between pitch accent and prosodic phrasing.

**Data & Analysis**  To test this, complex DPs made up of two adjectival modifiers (Adj1/Adj2) and a head noun (N) were elicited, as shown in (1) embedded in a carrier sentence.

\[(1) \quad \text{Gakkoo-de, omoi marui iruka dake hakkiri mieta} \]

‘At school, I clearly saw heavy round dolphins only’

This structure was suitable for testing as it provides speakers freedom to produce the DP as one entire phonological phrase, as in (Adj1 Adj2 N), or to place a left boundary between Adj1 and Adj2, as in (Adj1 (Adj2 N)), where Adj2 marks the beginning of a separate phonological phrase. To look at accentuation, three accent combinations for Adj1-Adj2 were analyzed: unaccented-unaccented /UU/, unaccented-accented /UA/, and accented-unaccented /AU/. 16 sentences were constructed for each accent combination, yielding 48 items. A total of 576 tokens were elicited from 6 native speakers of Tokyo Japanese in their early twenties.

Each token was first coded for its surface pitch accent (i.e. /UU/ → [AU]) of the two adjectives. Prosodic phrasing was then determined by coding for the presence (1 or 0) of a left boundary at Adj2, which is signaled by a pitch reset for an accented Adj2, or an initial F0 rise for an unaccented Adj2 [4,5]. Examples are shown in Figures 1-4. Statistical analysis was performed using a binary logistic regression model in R with surface pitch accent and underlying pitch accent as fixed effects, while speaker, item, and repetition were included as random effects.

**Results**  Overall, 366 tokens were phrased as (Adj1 Adj2 N) without an Adj2 boundary, and 210 tokens were phrased as (Adj1 (Adj2 N)) with an Adj2 boundary. The results showed a significant effect of surface pitch accent on prosodic phrasing. [AU] realizations correspond to an Adj2 boundary (z=6.34, p<.001), while [AA] (z=-2.25, p<.02) and [UA] (z=-2.32, p<.02) realizations correspond to the absence of an Adj2 boundary. The results for [UU] realizations were more mixed (z=.16, p=.87), with 60% tokens phrased without an Adj2 boundary, and the remaining 40% phrased with an Adj2 boundary. This is summarized in Table 1. No effect was found for underlying accent.

**Discussion & Conclusion**  These findings indicate that [AU] structure facilitates (Adj1 (Adj2 N)) type phrasing. These findings pattern with previous findings where phrase-final adjectives are more likely to be accentuated than noun-modifying adjectives. In a (Adj1 (Adj2 N)) type phrasing, Adj1 is more likely to be accentuated as it precedes a left boundary, while Adj2 is more likely to remain unaccented as it directly modifies the head noun. [AA], [UA], [UU] realizations, on the other hand, correspond to (Adj1 Adj2 N) type phrasing. Together, these results show that pitch accent and prosodic phrasing may not be mutually exclusive.
Figure 1: [AA] realizations, no boundary (left), Adj2 boundary (right)

Figure 2: [AU] realizations, no boundary (left), Adj2 boundary (right)

Figure 3: [UA] realizations, no boundary (left), Adj2 boundary (right)

Figure 4: [UU] realizations, no boundary (left), Adj2 boundary (right)

Table 1: Number of tokens by surface pitch accent and prosodic phrasing

<table>
<thead>
<tr>
<th>Surface Accent</th>
<th>(Adj1 Adj2 N)</th>
<th>(Adj1 (Adj2 N))</th>
<th>Std. Error</th>
<th>z</th>
<th>p</th>
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<tbody>
<tr>
<td>aa</td>
<td>126</td>
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<tr>
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<td>0.51</td>
<td>6.34</td>
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<td>118</td>
<td>9</td>
<td>0.55</td>
<td>-2.32</td>
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<tr>
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<td>80</td>
<td>40</td>
<td>0.59</td>
<td>0.16</td>
<td>0.87</td>
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References