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Kattobase: The Linguistic Structure of Japanese Baseball Chants

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1 Introduction

This paper develops the first constraint-based analysis of Japanese baseball chants, whose intricate organization casts a very revealing sidelight on the prosodic organization of the Japanese language itself. The source of most data and basic generalizations is the last author's dissertation (Tanaka 2008), supplemented by further empirical probing which clarified a number of unclear points.

Since the beginnings of metrical phonology, the analysis of chants has played an important role in the development of the theory. Liberman (1975) uses the English vocative chant ("Joohn!", with a High-Mid tune) to motivate basic properties of what came to be known as the "metrical theory of stress". He shows that, in order to formalize tune-to-text alignment, and to define what it means for a tune to be congruent with a text and its metrical pattern, a relational understanding of stress is necessary, as instantiated in metrical trees with their "strong-weak" labeling of all nodes.

Japanese baseball chants, an obligatory and quasi-ritual part of virtually every baseball game, are delivered by fans each time their team is at bat. They are accompanied by a variety of musical instruments (drums, trumpets, etc.) and take the form in (1). They consist of two measures of four beats, each composed of three notes plus one pause. 'XXX' is a rhythmically adapted form of the player's name. At issue here is the form of the rhythmic adaptation, which is tightly regulated and grounded, as we will show, in the rhythmic structure of the language itself.

(1)

```
kat to ba see  X  X  X
\[ \frac{\ddagger\ddagger\ddagger}{x} x \]
```

Morphological structure:
```
kat- tob - as - e
INTENSIFIER-fly-CAUS-IMP
'send it flying, hit a homerun'
```

The examples in (2) illustrate the phenomenon.¹

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¹ Our transcription is approximately phonemic and largely follows the Hepburn style of Romanization used by the leading dictionaries (Kenkyusha, among others), with some minor modifications: Vowel length is denoted by doubling; chi=[\[\ddagger\ddagger\]], tsu=[\[\ddagger\ddagger\]], shi=[\[\ddagger\ddagger\]], ji=[\[\ddagger\ddagger\]], hi=[\[\ddagger\ddagger\]], fu=[\[\ddagger\ddagger\]]; and n stands for the moraic nasal of Japanese, realized as a nasal glide (assimilating in place to following stop consonants).
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By way of introduction, we first summarize Tanaka's (2008) analysis, and at the same time present relevant examples. There are three separate rules, depending on the length of the input name, measured in moras ($\mu$). Each CV- or V-unit is one mora, so ichiroo$^*$ i-chi-ro-o is a 4$\mu$ name. Syllable-final consonants (mostly nasals) are also one mora ($son = so-n = 2\mu$).

Rule 1 in (3) deals with names up to 3$\mu$. The simplest case is names of exactly 3$\mu$, which fit the X,X,X,$_3$ template exactly, as seen in (4) (we write "L" for "light syllable", "H" for "heavy syllable", and "S" for "superheavy syllable").

(3) Rule 1a 3-mora names: Align the initial mora to the initial beat ($X_1$), the final mora to the final beat ($X_3$), the medial mora to the medial beat ($X_2$).

(4) Moras | Profile | Input | Output |
--- | --- | --- | --- |
3 | LLL | a. ka-ke-fu 谷 | kaa-kee-fuu |
   | HL | b. ba-a-su 水 | baa-a-su |
   | c. ge-n-da 源田 | gee-n-da |
   | d. sa-i-ki 松 | saa-i-ki |
   | LH | e. e-to-o 江藤 | ee-to-o |

It is important that the final mora goes to $X_3$, not the final syllable: This is why LH $[e_i-][to_2-o_3] \rightarrow [e_i-e]-[to_2-o]-[o-o]$ and not *[e_i-e]-[e-e]-[to_2-o_3]. By the same rule, HL $[ba_1-a_2]-[su_3] \rightarrow [ba_1-a]-[a_2-a]-[su_3-u]$, not *[ba_1-a_2]-[su_3-u]-[u-u]$. Rule 1b in (5) deals with shorter names. The crucial point is that the first mora fills $X_1$ and $X_2$ (ta_i-ni_2$\rightarrow$taa-aa-nii), not the second mora $X_2$ and $X_3$ (*ta_1-a-ni_3-i_1).

(5) Rule 1b In 2$\mu$ names, there is no medial mora. Spread from the left to fill $X_2$. In 1$\mu$ names, there is only an initial mora. Spread from the left to fill $X_2$ and $X_3$.

Illustrative examples appear in (6).

(6) Moras | Profile | Input | Output |
--- | --- | --- | --- |
2 | LL | a. tani 谷 | taa-aa-nii |
   | b. yano 矢野 | yaa-aa-noo |
   | H | c. son 宣 | soo-oo-nn |
   | d. chen 陈 | chee-ee-nn |
   | e. rii Lee | rii-ii-ii |
   | f. kai 甲斐 | ka-aa-ii |
   | L | g. ri 李 | rii-ii-ii |

(6cd) again illustrate the final-mora rule: $n$ alone fills $X_1$, not the final rhyme on: $[so_1-n_2] \rightarrow [so_1-o]-[o-o]-[n_2-n]$, not *[so_1-o]-[o-o]-[o-n_2]. Things are different with 4$\mu$ names, and longer names: Now the whole final syllable goes to $X_3$, whether light or heavy: *[i_i]-[chi]-[ro-o_2]$\rightarrow$[i_i]-[chi]-[ro-o_2], and not the final mora (*[i_i]-[chi]-[ro-o_2]). A new rule is therefore needed, given in (7).

---

2 See the Appendix for an alphabetized list of source names and player affiliation.
(7) Rule 2 4-mora names: Align the initial mora to X₁, the final syllable to X₃, medial moras to X₂.

More examples illustrating the pattern are given in (8).

(8) Moras | Profile | Input | Output
|-------|-------|-------|
| 4     | LLLL  | a. kiyohara 清原                 kii-yoha-raa
|       |       | b. tatsunami 立浪               taa-tsuna-mii
|       |       | c. rinaresu Linares            rii-nare-suu
|       |       | d. kuromati Cromartie          kuu-roma-tii
| LLH   | e. ichiroo イチロー             ii-chi-roo
|       | f. ochiai 落合                  oo-chi-ai
|       | g. wiruson Wilson               wii-ruu-son
| HLL   | h. joojima 城島                  joo-oji-maa
|       | i. ootomo 大友                 oo-oto-moo
| HH    | j. hansen Hansen                haa-nn-sen
|       | k. taihoo 大豊                taa-ii-hoo
|       | l. shinjoo 新庄                shii-nn-jo
| LHL   | m. furanko Franco               fuu-ran-koo

Besides the emergence of the final syllable as a mapping target, the mapping of HLL names (8hi) is remarkable: *[joi₁-oi₂]-[ji₁]-[maa₁] → [joi₉]-[jo₁]-[jii₁]-[maa₁], not *[joi₁-oi₂]-[ji₁]-[maa₉]. As indicated, we understand the winning output as mapping the two o-moras to different beats (with an onset violation). Here we simply note the facts, and will return to their explanation in the next section.

A special case are 4μ names like *[ka₁]-[ra₂]-[i₉]-[n₉] (Klein) (9a), whose profile seems to be LS. If it is the case that the superheavy syllable is actually broken up into L+H *[ka₁]-[ra₂]-[i₉]-[n₉], as argued by several authors, including Vance (2008, 125–127), Kubozono (2015, 13–16), and Ito and Mester (2018, 212–216), the final syllable rule already covers this case. The long vowel in (9b) seems to resist this kind of splitting.

(9) Moras | Profile | Input | Output
|-------|-------|-------|
| 4     | LS or LLH  | a. kurain Klein               kuu-raa-in
|       |       | b. kuruun Kroon               kuu-ruu-nn
| SL or LHL | c. baanzu Barnes       baa-an-zuu
|       |       | d. joonzu Jones               joo-on-zuu

Names with 5 or more moras follow the same final syllable rule, but we need to distinguish two cases on the basis of the weight of the penultimate syllable. Names with penultimate H map this syllable to X₂, as formulated in (10) and illustrated in (11).

(10) Rule 3a ≥5μ names with H penultimate syllable: Align the final syllable to X₃, the penultimate H syllable to X₂, the remainder (which can be of any length) to X₁.

(11) Moras | Profile | Input | Output
|-------|-------|-------|
| 5     | HHL   | a. boochaado Borchard         boo-chaa-doo
|       |       | b. seginooru Seguinol         segi-noo-ruu
|       |       | c. deshinsei DeCinces         dee-shin-sei
| 6     | LLLLH | d. desutoraade Destrade       desuto-raa-dee

In (12) we give the corresponding rule for names with L in the penult, as illustrated in (13).

³ Another less preferred variant is kuu-rai-nn.
(12) Rule 3b  
≥5μ names with L penultimate syllable: Align the final syllable to X₃, the penultimate L syllable and the antepenultimate syllable (whether L or H) to X₂, the remainder (which can be of any length) to X₁.

(13) Moras | Profile | Input | Output |
---|---|---|---|
5  | HLLL | a. gonzaresu | González | gon-zare-suu |
   | LLLL | b. makudonarudo | Macdonald | makudo-naru-doo |
   | LHLH | c. robaatoson | Robertson | roo-baato-son |

In (14), we give more examples of ≥5μ names.

(14) Moras | Profile | Input | Output |
---|---|---|---|
5  | LLLL | a. ogasawara | 小笠原 | oga-sawa-raa |
   | LLLL | b. kobayakawa | 小早川 | koba-yaka-waa |
   | LLLL | c. arekkusu | Alex | aa-rekku-suu |
   | LLLL | d. mahoomuzu | Mahomes | maa-hoomu-zuu |
   | LLLL | e. kitabeppu | 北別府 | kita-bep-puu |
   | LLLL | f. oguribii | Oglivie | oo-guri-bii |
   | LLLL | g. infante | Infante | in-fan-tee |
   | LLLL | h. boochado | Borchard | boo-chaa-doo |
   | LLLL | i. buranboo | Brumaugh | buu-ran-boo |
   | LLLL | j. oosutin | Austin | oo-osu-tin |
   | LLLL | k. doddoson | Dodson | doo-oddo-son |
   | LLLL | l. bansuroo | Vance Law | baa-nsu-roo |
6  | LLLL | m. kontorerasu | Contreras | konto-rea-su |
   | LLLL | n. furanshisuko | Francisco | furan-shisu-koo |
   | LLLL | o. ferunandesu | Fernández | feru-nande-suu |
   | LLLL | p. desutefaano | Distefano | desute-faa-noo |
   | LLLL | q. makanarutii | McAnulty | maka-naru-tii |
7  | LLLL | r. gengoroomaru | 源五郎丸 | gengo-rooma-ruu |

2 Analysis

The challenge any analysis must cope with is that we seem to be dealing with three separate patterns, as summarized in (15).

(15) 1. for ≤3-mora names: last mora goes to last beat
2. for 4-mora names: last syllable goes to last beat
3. for ≥5-mora names: last syllable goes to last beat, and special provisos for H and L penults

Ideally we would like to unify everything into a single rule, but the distinction between the three patterns seems very well motivated, having to do with the length of the input. Since the overall goal is to split the input into three parts, which are then mapped to the three beats, it makes sense that what goes into the last beat is different for short names and for longer names. But "making sense" is not yet an explanation—our goal is now to give an analysis in Optimality Theory (OT, Prince and Smolensky 1993), in terms of ranked and violable constraints, and capture the different aspects of the pattern in one single and uniform constraint ranking, instead of having three distinct procedures.

We first lay out our constraints, beginning in (16), where "K" stands for "kattobase form".
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\[(16)\]

\[\begin{array}{ll}
\text{a. } & K = X_1X_2X_3 \\
\text{b. } & X \geq \text{FOOT} \\
\text{c. } & \text{FOOTFORM}(X_2) \\
\text{d. } & \text{MAX} \\
\text{e. } & \text{ALIGN-LEFT}(X_3, \mu) \\
\text{f. } & \text{ALIGN-LEFT}(X_3, \sigma) \\
\end{array}\]

A kattobase form consists of 3 beats, \(X_1X_2X_3\).

A beat is minimally a foot (Ft).

\(X_2\) is a quantitative trochee (H, LL, or HL).

Every element of the input is present in \(K\).

The left edge of \(X_3\) corresponds to the left edge of (the content of) the last mora of the input. One violation when the edges do not coincide.

The left edge of \(X_3\) corresponds to the left edge of (the content of) the last syllable of the input. One violation when the edges do not coincide.

For our purposes, the basic rhythmic structure of Japanese is the trochaic (strong-weak, sw) foot with the three forms in (17), which include the uneven trochee HL, for reasons we will return to.

\[(17)\]

\[
\begin{array}{cccc}
\text{Ft} & \text{Ft} & \text{Ft} \\
\sigma & s \sigma & s \sigma \\
L & L & H & H L \\
\end{array}
\]

\[\begin{array}{cccc}
ta & ta & taa & taa ta \\
\end{array}\]

(16c) raises an immediate question: Why is there a special constraint requiring \(X_2\) to be exactly a trochee? Empirically speaking, the answer is clear: In long names, material exceeding the size of a trochee goes into \(X_1\), not into \(X_2\): \(MacDonald \rightarrow \text{makudo-naru-doo}\), not \(\text{*maku-donaru-doo}\). \(X_3\) is in any case restricted to the last syllable of the input because of the ALIGN-LEFT constraints (\(\sigma, \mu\)): \(MacDonald \rightarrow \text{makudo-naru-doo}\), \(\text{*maku-dona-rudo}\).

But what is the reason \(X_2\) plays this special role, not \(X_1\) or \(X_3\)? Our hypothesis is that the reason lies in what \(X_2\) corresponds to in a Japanese word: It corresponds to the last, and most prominent, foot of the word, the foot which receives the default antepenultimate accent, as illustrated in (18).

\[(18)\]

\[
\begin{array}{cccc}
\text{Ft} & \text{Ft} \\
\sigma & \sigma \\
\text{ka ri} & \text{kyú ra} & \mu \\
\end{array}
\]

If so, FOOTFORM(\(X_2\)) is actually FOOTFORM(\(\text{HEADFOOT}\)), a positional markedness constraint, as in (19).

\[(19)\]

\[
\begin{array}{cccc}
\text{FOOTFORM(HEADFOOT)} \\
\end{array}
\]

The headfoot is a quantitative trochee (H, LL, or HL).

In conjunction with (20a), the general DEP-\(\mu\) constraint militating against any kind of lengthening, there is also another headfoot-specific positional faithfulness constraint (20b) preventing epenthesis in \(X_2\).

\[(20)\]

\[\begin{array}{ll}
\text{a. DEP-\(\mu\)} & \text{Every mora in the output has a correspondent in the input—no epenthesis of a mora (i.e., no lengthening).} \\
\text{b. DEP-\(\mu\)} & \text{Every mora in the output’s head foot has a correspondent in the input—no epenthesis of a mora (i.e., no lengthening).} \\
\text{(HEADFOOT)} \\
\end{array}\]

The remaining constraints cover familiar territory: There are two crisp edge constraints (Ito and Mester 1999) militating against spreading consonants or vowels across X-boundaries (21ab), and the familiar onset constraint (21c).
(21) a. **CrispEdge-C**
   The edges of X are crisp: no spreading of consonants across. One violation for every consonant linked to two different Xs.

b. **CrispEdge-V**
   The edges of X are crisp: no spreading of vowels across. One violation for every vowel linked to two different Xs.

c. **Onset**
   A syllable has an onset.

The overall ranking of the constraints is as in (22). We will gradually justify all dominance relations.

(22) $\text{MAX}$

```
\text{CrispEdge-C} \quad X \geq \text{FT} \quad \text{FootForm(HdFT)}
```

```
\text{CrispEdge-V}
```

```
\text{Align-L}(X_3, \sigma)
```

```
\text{Dep-}\mu(\text{HdFT}) \quad \text{Align-L}(X_3, \mu)
```

```
\text{Onset}
```

```
\text{Dep-}\mu
```

The simplest case is 3μ names (23) such as $k\text{a}_1-k\text{e}_2-fu_3 \rightarrow k\text{a}_1-k\text{e}_2-fu_3-uu$. Comparing the winning candidate (23a) with (23d) $k\text{a}_1-k\text{e}_2-fu_3-uu$, we see the constraint $\text{Dep-}\mu(\text{HdFT})$, violated by the winner, must be dominated by either $\text{CrispEdge-V}$ or $\text{Align-L}(X_3, \sigma)$, which are both violated by the loser.\(^4\)

(23)

| INPUT  | OUTPUT       | MAX | CrispEdge-C | $X \geq \text{FT}$ | FootForm(HdFT) | CrispEdge-V | Align-L($X_3, \sigma$) | Align-L($X_3, \mu$) | Dep-μ | Onset | Dep-μ |
|--------|--------------|-----|-------------|---------------------|----------------|-------------|----------------------|----------------------|-------|-------|-------|
| kakefu | a. ► kaa-kee-fuu | 1   | 1           | 1                   | 3              |             |                      |                      |       |       |       |
|        | b. kaa-ake-fuu  | 1   | 1           | 1                   | 1              | 3           |                      |                      |       |       |       |
|        | c. kake-ee-fuu  | 1   | 2           | 1                   | 1              | 3           |                      |                      |       |       |       |
|        | d. kaa-kefu-uu  | 1   | 1           | 1                   | 1              | 1           |                      |                      |       |       |       |
|        | e. kake-fuu-uu  | 1   | 1           | 1                   | 1              | 3           |                      |                      |       |       |       |
|        | f. kaa-aa-kefu  | 1   | 1           | 2                   | 1              | 1           |                      |                      |       |       |       |
|        | g. ka-ke-fu     | 3   | 1           |                     |                |             |                      |                      |       |       |       |

The winning candidate $k\text{a}_1-k\text{e}_2-fu_3-uu$ also shows three instances of mora epenthesis, and thus violates general $\text{Dep-}\mu$ three times. Since this constraint is bottom-ranked and does not contribute to the explanation in interesting ways, we will in general not include it in our tableaux.

Turning next to short names, we give tableaux for 1μ- and 2μ-names in (24) and (25).

\(^4\) Technically, $\text{Onset}$ or $\text{Align-L}(X_3, \mu)$ could also dominate $\text{Dep-}\mu(\text{HdFT})$ with the same effect, but we will soon see that these must be ranked lower.
A similar point holds for \( \text{rii-ii} \) in (24) does not align the last syllable with \( X \).

The fact that (24a) wins over (24def) shows that \( X\geq Ft \) dominates all of \( \text{CRISP-E-V}, \text{AL-L}(X_3, \sigma), \text{DEP-}\mu(\text{HdFt}), \text{AL-L}(X_3, \mu) \), and \( \text{ONSET} \). In (25), (25a) \( ta\_a-aa-nii \), with its two violations of \( \text{DEP-}\mu(\text{HdFt}) \), wins over (25b) \( ta\_a-nii-ii \) (with only one violation). This teaches us that \( \text{AL-L}(X_3, \sigma) \gg \text{DEP-}\mu(\text{HdFt}) \). Another possibility would be \( \text{AL-L}(X_3, \mu) \gg \text{DEP-}\mu(\text{HdFt}) \), but we will see below in (32) that there is independent evidence for \( \text{AL-L}(X_3, \sigma) \gg \text{DEP-}\mu(\text{HdFt}) \).

(26a) \( so\_oo-oo-nn \) beats, and harmonically bounds, (26b) \( so\_oo-oo-on \) because it does better on \( \text{CRISP-E-V} \) and \( \text{AL-L}(X_3, \mu) \).

A similar point holds for \( ba\_a2su \rightarrow ba\_a2a-su\_u \) and \( ge\_n\_da \rightarrow ge\_e-\_n\_da\_a \) in (27). Note that the winning candidate \( ba\_a2a-su\_u \) assigns the two \( a \)-moras to different syllables—the candidate \( ba\_a2a-su\_u \) does worse both on \( \text{CRISP-E-V}, \text{AL-L}(X_3, \sigma) \) and \( \text{DEP-}\mu(\text{HdFt}) \) and is harmonically bounded by the winner.

---

5 Another possibility would be \( \text{AL-L}(X_3, \mu) \gg \text{DEP-}\mu(\text{HdFt}) \), but we will see below in (32) that there is independent evidence for \( \text{AL-L}(X_3, \sigma) \gg \text{DEP-}\mu(\text{HdFt}) \).
(27)

| INPUT | OUTPUT          | MAX | CrispE-C | X≥Pt | FTPRM | CrispE-V | Al-L (X3, σ) | Def-hit | AL-T | Onset |
|-------|-----------------|-----|----------|------|-------|----------|--------------|---------|------|-------|
| ba(2)absu | a. ba⁺a-a⁺a-su⁺u |     |          |      |       |          |              |         |      |       |
| Bass   | b. ba⁺a-su⁺a-su⁺u | 1   | 1        | 1    | 1     |          |              |         |      |       |
|        | c. ba⁺a-a-su⁺a-su⁺u | 1   | 2        | 1    | 1     |          |              |         |      |       |
|        | d. ba⁺a-asu⁺a-su⁺u | 1   | 1        | 1    | 1     |          |              |         |      |       |
|        | e. X-ba⁺a-su⁺a-su⁺u | 1   |          |      |       |          |              |         |      |       |
| ge(2)ada | f. ge⁺a-n-n-daa |     |          |      |       |          |              |         |      |       |
| 源田  | g. ge⁺a-da⁺a-da⁺a | 1   | 1        | 1    | 1     |          |              |         |      |       |
|        | h. ge⁺a-nda⁺a-da⁺a | 1   | 1        | 1    | 1     |          |              |         |      |       |

An interesting contrast to the HL-word ba⁺a-su⁺a-su⁺u is the LH word e⁺e⁺-to⁺-o⁺o in (28): Even though ALIGN-LEFT(X3, σ), which ranks higher than ALIGN-LEFT(X3, μ), favors (28b), CrispEDGE-V, which ranks even higher, selects (28a).

(28)

| INPUT | OUTPUT | MAX | CrispE-C | X≥Pt | FTPRM | CrispE-V | Al-L (X3, σ) | Def-hit | AL-T | Onset |
|-------|--------|-----|----------|------|-------|----------|--------------|---------|------|-------|
| e⁺e⁺-to⁺o⁺o | a. e⁺e⁺-to⁺-o⁺o |     |          |      |       |          |              |         |      |       |
| 江藤  | b. e⁺e⁺-ee⁺-to⁺o⁺o | 1   | 2        | 1    | 1     |          |              |         |      |       |
|        | c. e⁺e⁺-to⁺-o⁺-o⁺o | 1   | 1        | 1    | 1     |          |              |         |      |       |

To recapitulate the crucial constraint interactions, we compare the derivations for tan, baasu, and etoo in (29).

(29)

| INPUT | OUTPUT | MAX | CrispE-V | Al-L (X3, σ) | Def-hit | AL-T | Onset |
|-------|--------|-----|----------|--------------|---------|------|-------|
| LL ta⁺ni⁺i | a. ta⁺a-aa-ni⁺i | 1   | 2        |              |         |      |       |
| 谷    | b. ta⁺a-∧ni⁺i | 1   | 1        |              |         |      |       |
| HL ba⁺a-su⁺u | c. ba⁺a-∧a⁺-su⁺u | 1   |          |              |         |      |       |
| Bass  | d. ba⁺a-asu⁺a-su⁺u | 1   |          |              |         |      |       |
| LH e⁺e⁺-to⁺o⁺o | e. e⁺e⁺-ee⁺-to⁺o⁺o | 1   | 2        |              |         |      |       |
| 江藤  | f. e⁺e⁺-to⁺-o⁺-o⁺o | 1   | 1        |              |         |      |       |

While in 3μ-words ending in H the last mora, not the last syllable, is assigned to X3 (because of CrispE-V, see (29ef)), this is not the case in 4μ-words ending in H, as shown in (30). Here (30a) and (30e) do not violate CrispE-V, so AL-L(X3, σ) decided in favor of the candidates assigning the final syllable to X3.

6 Note that the two parts of the long vowel are evaluated separately by CrispE-V, that is why the winner e⁺e⁺-to⁺-o⁺o does not violate this constraint.
(30)

| INPUT   | OUTPUT            | MAX | CRISPE-C | X≥Fr | FT-RM | CRISP-E-V | A-L | D-HF | D-FF | D-FF | T-A | ONS-T | DEP-T |
|---------|-------------------|-----|----------|------|-------|-----------|-----|------|------|------|-----|-------|-------|
| shi1ni1jo1o14 | ▶ shi1ni1jo1o14   | 1   | 1        | 1    |       |           |     |      |      |      |     |       |       |
| 新庄    |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| (32)    |                   |     |          |      |       |           |     |      |      |      |     |       | (3)   |
| ta1i1ho1o14 | ▶ ta1i1ho1o14   | 1   | 1        | 1    | 1     |           |     |      |      |      |     |       |       |
| 大豊    |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| a.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| b.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| c.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| d.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| e.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| f.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| g.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| h.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |

A LLLL-name like kiyohara assigns only the first mora to X₁ and applies lengthening here, not in X₂ because of DEP-μ(HdFrT) (31a) vs. (31b).

(31)

| INPUT   | OUTPUT            | MAX | CRISPE-C | X≥Fr | FT-RM | CRISP-E-V | A-L | D-HF | D-FF | D-FF | T-A | ONS-T | DEP-T |
|---------|-------------------|-----|----------|------|-------|-----------|-----|------|------|------|-----|-------|-------|
| kiyohara | ▶ kii-yohara-raa | 2   |          |      |       |           |     |      |      |      |     |       |       |
| 清原    |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| a.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| b.      | kii-haa-raa       | 2   |          |      |       |           |     |      |      |      |     |       |       |
| c.      | kii-yoo-hara      | 2   |          |      |       |           |     |      |      |      |     |       |       |
| d.      | kii-hara-aa       | 2   |          |      |       |           |     |      |      |      |     |       |       |
| e.      | kii-yohara-aa     | 2   |          |      |       |           |     |      |      |      |     |       |       |

But lengthening in X₂ is not absolutely ruled out and indeed found when a higher-ranking constraint is at stake. This is shown by a 4μ-name like kurain, whose syllabification we take to be ku-rai-in (see (9) above): (32a) ku-raa-in beats (32b) ku-rai-nn because of ALIGN-LEFT(X₃,σ), which crucially dominates DEP-μ(HdFrT) and At-L(X₃,μ).³

(32)

| INPUT   | OUTPUT            | MAX | CRISPE-C | X≥Fr | FT-RM | CRISP-E-V | A-L | D-HF | D-FF | D-FF | T-A | ONS-T | DEP-T |
|---------|-------------------|-----|----------|------|-------|-----------|-----|------|------|------|-----|-------|-------|
| kurain  | ▶ ku-raa-in       | 1   | 1        | 1    | 1     |           |     |      |      |      |     |       |       |
| Klein   |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| a.      |                   |     |          |      |       |           |     |      |      |      |     |       |       |
| b.      | ku-rai-nn         | 1   | 1        | 1    | 1     |           |     |      |      |      |     |       |       |
| c.      | kura-ii-nn        | 2   |          |      |       |           |     |      |      |      |     |       |       |
| d.      | kura-in-nn        | 2   |          |      |       |           |     |      |      |      |     |       |       |
| e.      | kura-ii-aa        | 2   |          |      |       |           |     |      |      |      |     |       |       |
| f.      | ku-uu-rain        | 2   |          |      |       |           |     |      |      |      |     |       |       |

In (33) the winner (33a) joo-iji-maa beats (33b) joo-ji-maa because it avoids lengthening within the head foot X₂, at the cost of lengthening in X₁ and an onset violation.⁸

³ But ku-rai-nn is another possible (if less preferred) output, so there might be some variability in the ranking between At-L(X₃,σ) and one or both of its dominated constraints.

⁸ The winner is (33a), which distributes the two o-moras over X₁ and X₂, and not the homonymous (33c), which keeps both o-moras within X₁ but has gratuitous violations of CRISP-E-V and DEP-μ(HdFrT).
(33)

| INPUT         | OUTPUT       | MAX | CRISP-E-C | YEFT | FT-FRM | CRISP-E-V | Al-L | Dep-μ (HdFt) | Al-L (Xa-j) | ONSET |
|---------------|--------------|-----|-----------|------|--------|-----------|------|--------------|------------|-------|
| 城島           | a. ▶jo1-o2j13-ma_a |     |           |      |        |           |      |              |            |       |
|               | b. jo1o2-jij1-ma_a |     |           |      |        |           |      |              |            |       |
|               | c. jo1o2-oji1-maa  | 1   | 1         |      |        |           |      |              |            |       |
|               | d. jo1o2j13-ii1-maa |     |           |      |        |           |      |              |            |       |
|               | e. jo1o2-jii1-maa   | 1   | 1         |      |        |           |      |              |            |       |
|               | f. jo1o2j13-maa-aa  | 1   | 1         | 1    | 1      |           |      |              |            |       |
|               | g. X:jo1o2j13-maa   | 1   |           |      |        |           |      |              |            |       |

Recapitulating the crucial interactions, we compare the derivations for ichiro and joojima in (34).

(34)

| INPUT         | OUTPUT       | MAX | CRISP-E-V | Yeft | FT-FRM | CRISP-E-V | Al-L | Dep-μ (HdFt) | Al-L (Xa-J) | ONSET |
|---------------|--------------|-----|-----------|------|--------|-----------|------|--------------|------------|-------|
| LLH           | iichi1ro03a  |     |           |      |        |           |      |              |            |       |
|               | iichi1ro03a  | 1   | 1         |      |        |           |      |              |            |       |
| HLL           | jo1o2j11-ma_a | c.  | jo1o2j11-ma_a | 1   | 1      |           |      |              |            |       |
|               | d. ▶jo1o2j11-ma_a |     |           |      |        |           |      |              |            |       |

The candidate ii-chii-roo bests ii-ichi-roo because CRISP-E-V >> Dep-μ(HdFt). But, as we just saw in (33), joo-aji-maa bests joo-jii-maa because CRISP-E-V is not involved, and Dep-μ(HdFt) >> ONSET. The same kind of same interaction is found in the derivation of the 5μ-name oosutin ▶ oo-osu-tin in (35).

(35)

| INPUT         | OUTPUT       | MAX | CRISP-E-C | Yeft | FT-FRM | CRISP-E-V | Al-L | Dep-μ (HdFt) | Al-L (Xa-J) | ONSET |
|---------------|--------------|-----|-----------|------|--------|-----------|------|--------------|------------|-------|
| Austin        | o1o2sui1n   |     |           |      |        |           |      |              |            |       |
|               | a. ▶o1o2su1n |     |           |      |        |           |      |              |            |       |
|               | b. o1o2su1n  | 1   | 1         | 1    | 1      |           |      |              |            |       |
|               | c. o1o2su1n  | 1   |           |      |        |           |      |              |            |       |

The 5μ-name doddoson in (36), whose kattobase-form is (36a) doo-oddo-son and not (36c) dod-doo-son, shows that spreading a consonant across X-boundaries is worse than spreading a vowel: CRISP-EDGE-C >> CRISP-EDGE-V.

(36)

| INPUT         | OUTPUT       | MAX | CRISP-E-C | Yeft | FT-FRM | CRISP-E-V | Al-L | Dep-μ (HdFt) | Al-L (Xa-J) | ONSET |
|---------------|--------------|-----|-----------|------|--------|-----------|------|--------------|------------|-------|
| Dodson        | a. ▶doo-oddo-son |     |           |      |        |           |      |              |            |       |
|               | b. doo-oddo-son |     |           |      |        |           |      |              |            |       |
|               | c. dod-doo-son | 1   |           |      |        |           |      |              |            |       |
|               | d. dod-doo-son | 1   |           |      |        |           |      |              |            |       |
|               | c. dod-dodo-nn | 1   |           |      |        |           |      |              |            |       |
5μ-names (and longer names) clarify some issues that have so far not come up. First, there is the question of where "extra" material goes: moras that are not needed to fill each X with one foot. This issue is settled by (37): X₁ is the place for extra material (makudonaru-doo), not X₂ (*makudonaru-doo) or X₃ (*makudonaru-dudo). This is ensured by the dominance of AL-L(X₃,μ) and/or AL-L(X₃,δ) over DEP-μ, as shown by (37a) vs. (37c).

\[\text{(37)}\]

| INPUT | OUTPUT |
|-------|--------|
| makudonaru-doo | a. ▶ makudonaru-doo |
|           | b. makudonaru-du-
| Macdonald |        |
|           | c. maku-dono-rudo |
|           | d. maku-donaru-
|           | e. mado-naru-
|           | 2 |

Next, there is the issue of assigning antepenult-penult sequences of different quantitative profiles (LH, HH, LL, HL) to X₁ and X₂ (see (10)-(13) above). (38) shows that a heavy penult fills X₂ by itself.

\[\text{(38)}\]

| INPUT | OUTPUT |
|-------|--------|
| desutoraade | a. ▶ desuto-raa-dee |
| ...LH... | b. desu-tora-ade |
| Destrade | c. desutora-a-
|           | d. desu-toraa-
|           | e. desu-torada-
|           | 1 |
| buraianto | f. ▶ burai-an-
| ...HH... | g. buu-raian-
| Bryant | h. burai-anto-
|           | 1 |

In (39), we see that a light penult is assigned to X₂ together with the antepenult, whether the antepenult is light or heavy.⁹

\[\text{(39)}\]

| INPUT | OUTPUT |
|-------|--------|
| makudonaru-doo | a. ▶ makudonaru-
| Macdonald |        |
|           | b. makudon-
|           | c. maku-
|           | d. maku-
|           | e. mado-
|           | 2 |

⁹ The fact that the HL sequence buuto is assigned to X₂ is the motivation for admitting the uneven trochee HL as a quantitative trochee in Japanese. It remains to be seen whether it is possible to find an alternative analysis which conforms to the standard view going back to Poser (1984; 1990) that admits only the bimoraic trochee.
Recapitulating, we juxtapose the derivations for *makudonarudo*, *boochaado*, *robaatoson*, and *desutoraade* in (40), showing only the crucial constraint interactions.

(40)

| INPUT | OUTPUT |
|-------|--------|
| ...LH... desutoraade | a. ► desuto-raa-dee |
| Destrade | b. desutorra-dee |
| ...HH... | c. ► burai-an-too |
| Bryant | d. buu-raian-too |
| ...LL... | e. ► makudo-naru-doo |
| Macdonald | f. makudona-nru-doo |
| ...HL... robaatoson | g. ► roo-baato-son |
| Robertson | h. robaa-too-son |

3 Summary and conclusion

We summarize by first assembling the evidence for all constraint rankings. The overall system is repeated in (41).

(41) MAX

\[
\begin{array}{c|c|c|c|c}
\text{MAX} & \text{CRISPEDGE-C} & X_{\geq FT} & \text{FOOTFORM(HdFt)} \\
1 & 2 & 3 & 4 \\
\end{array}
\]

In (42), we present the evidence for each of the labeled ranking relation (produced with the help of OTWorkplace (Prince et al. 2015)). Crucial W(inner)~L(oser) pairs justifying a particular ranking are given in bold. "W" in a constraint column means that the constraint prefers the winner; "L" means that the constraint prefers the loser. What is important here is the core of OT ranking logic: In order for the winner to defeat a given loser, it must do better on the highest-ranking constraint that distinguishes the two.
In conclusion, the OT-analysis, with its ranked and violable constraints, has succeeded in folding what appeared to be a set of separate rules depending on the length of the input into a single unified constraint system with a single ranking, where the length of the input exerts its influence by resulting in different violation profiles in outputs, and does not require separate rules for inputs of different length. Besides the alignment constraints specific to the baseball chant, the other constraints are uncontroversial faithfulness (MAX/Dep) constraints and structural markedness constraints (on foot/syllable structure and their edges). Among the many remaining questions, however, the most important perhaps is why the desired foot form in X₂ is the quantitative trochee that admits also the trimoraic HL-foot, and not the bimoraic trochee otherwise firmly grounded in the phonology of Japanese. It is clear that much work remains to be done—in particular in grounding the constraints better in the prosodic system of the language.

4 Appendix

| Romanized transcription | Original Name | Katakana transcription | Former/Main Team |
|------------------------|--------------|------------------------|-----------------|
| arekkusu               | Alex Ochoa   | アレックス               | Chunichi Dragons |
| baanzu                 | Jacob Barnes | バーンズ                 | Milwaukee Brewers |
| baasu                  | Randy Bass   | バース                  | Hanshin Tigers   |
| bansuroo               | Vance Law    | バンスロー               | Chunichi Dragons |
| boochaado              | Joe Borchard | ボーチャード             | Chicago White Sox |
| buranboo               | Cliff Brumbaugh | ブランボー          | Orix Buffaloes  |
| chen                   | 陳           | チェン                  | Chunichi Dragons |
| deshinsel              | Doug DeCinces | デシンセイ             | Yakult Swallows  |
| desutefaano            | Benny Distefano | デステファーノ         | Chunichi Dragons |
| desutoraade            | Orestes Destrade | デストラーデ         | Seibu Lions      |
| doddoson               | Pat Dodson   | ドッソソン               | Kintetsu Buffaloes |
| etoo                   | 江藤         | エトー                  | Chunichi Dragons |
| ferunandesu            | José Fernández | フエルナンデス         | Florida Marines  |
| furanku                | Julio Franco  | フランコ                | Lotte Marines    |
| furanhisuko            | Juan Francisco | フランシスク          | Yomiuri Giants   |
| genda                  | 源田        | ガンダ                 | Seibu Lions      |
| gengoroomaru           | 源五郎丸     | ゲンゴローマル          | Hanshin Tigers   |
| gonzaresu              | Dicky González | ゴンザレス           | Yakult Swallows  |
| Name     | Player          | Team             |
|----------|-----------------|------------------|
| hansen   | Bob Hansen      | Seibu Lions      |
| ichiroo  | Ichiroi         | Seattle Mariners |
| infante  | Omar Infante    | Detroit Tigers   |
| joojima  | City            | Hanshin Tigers   |
| joonzu   | Garrett Jones   | Yomiuri Giants.  |
| kai      | Kai             | Softbank Hawks   |
| kakefu   | Kakefu          | Hanshin Tigers   |
| kitabeppu| Kitabeppu       | Hiroshima Carp   |
| kiyohara | Kiyohara        | Yomiuri Giants.  |
| kobayakawa| Kobayakawa    | Yakult Swallows  |
| kontorerasu| Kontorerasu  | Chicago Whitesox |
| kurain   | Phil Klein      | DeNA BayStars    |
| kuromati | Warren Cromartie| Yomiuri Giants.  |
| kuruun   | Marc Kroon      | Yomiuri Giants.  |
| mahooomuzu| Mahoomuzu      | DeNA BayStars    |
| makanarutii| Makanarutii   | San Diego Padres |
| makudonarudo| Makudonarudo | Hanshin Tigers   |
| ochiai   | Ochiai          | Chunichi Dragons |
| ogasawara| Ogasawara       | Yomiuri Giants.  |
| oguribii | Ben Ogilvie     | Kintetsu Buffaloes|
| oosutin  | Tyler Austin    | New York Yankees |
| ootani   | Ootani          | LA Angels        |
| ootomo   | Ootomo          | Yomiuri Giants.  |
| ri       | Ri              | Chunichi Dragons |
| rii      | Leon Lee        | Lotte Orions     |
| rinaresu | Omar Linares    | Chunichi Dragons |
| robatoonosu| Robatoonosu  | New York Yankees |
| saiki    | Saiki           | Hanshin Tigers   |
| seginorou| Seginorou       | Nippon Ham       |
| shinjoo  | Shinjoo         | Hanshin Tigers   |
| shipin   | Shipin          | Yomiuri Giants.  |
| son      | Son             | Chunichi Dragons |
| taino    | Taino           | Yomiuri Giants.  |
| tatsunami| Tatsunami       | Chunichi Dragons |
| wiruson  | George Wilson   | Seibu Lions      |
| yano     | Yano            | Hanshin Tigers   |

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