

## Prosodic Adjunction in Japanese Compounds\*

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This paper explores a particular part of the prosodic hierarchy—the area falling between the prosodic word and the phonological phrase. It develops a framework that reduces the types of genuine prosodic categories while at the same time making systematic use of adjunction structures and concomitant functional notions like maximal and minimal instantiations of categories. A detailed analysis of the prosodic typology of compounds in Japanese suggests that the theory maintains enough flexibility to distinguish what needs to be distinguished but avoids multiplying prosodic categories beyond necessity.

### 1. Introduction

A universal hierarchy cannot easily admit language-specific gaps. This has been a problem with the prosodic hierarchy above the word level, where troublesome ‘holes’ have been diagnosed, with good evidence, in particular languages. The hierarchy is widely seen as a richly articulated sequence like "utterance" > "intonational phrase" > "major phrase" > "minor phrase" > "word", and domains corresponding to these categories have indeed been motivated for English and other languages. But Japanese, for example, has been claimed to possess only a single category corresponding to "utterance" and "intonational phrase" (Pierrehumbert and Beckman 1988). The so-called "J-ToBI" model (see Venditti 1997) goes even further in fusing "utterance", "intonational phrase", and "major phrase" into a single unit in the specific case of Japanese, the main evidence being absence of evidence for a distinction. It is of some comfort that Kawahara and Shinya (2006) present data that might support a distinction between three levels, upholding universality, but this does not resolve the general problem: The hierarchy is arguably overarticulated, having ended up with a collection of descriptive elements motivated for specific languages but difficult to establish cross-linguistically.<sup>1</sup>

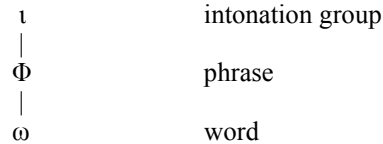
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<sup>1</sup> Beckman and Pierrehumbert (1986) develop an early insightful treatment of the problem (see Truckenbrodt 2006 for recent discussion). The problem is sometimes even terminologically obvious from categories with labels like "accent phrase" or "tone group", etc., which lack cross-linguistic validity by the very way they are defined.

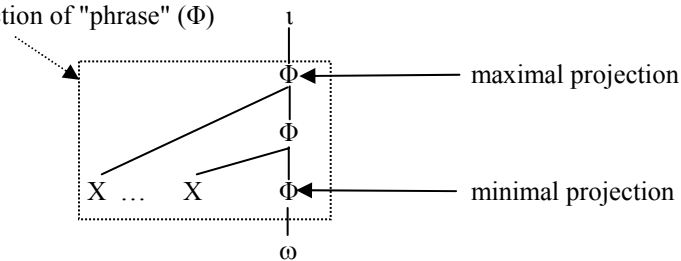
Setting aside the word-internal units "foot", "syllable", and "mora", which each have a substantive phonological definition, our proposal is to pare the system down to three elementary categories: "intonation group",<sup>2</sup> "phrase", and "word", as shown in (1), i.e., without a distinction between different *categories* at the phrase level.

(1) The prosodic hierarchy



Additional layers have a different status. They are not categories by themselves, but arise through prosodic adjunction to the three elementary categories, as shown in (2) for "phrase".<sup>3</sup>

(2) Projection of "phrase" (Φ)



This is an instance of the general distinction between categorial and relational notions: Terms like *syllable*, *mora*, *labial*, *coronal*, *dorsal*, *noun*, and *tense* are examples of the former, whereas *head/non-head*, *independent/dependent (mora)*, *subject/object* are relational notions. Similarly, *phrase* (Φ) and *word* (ω) are categories, but *maximal* (ι/ω) and *minimal* (Φ/ω) are intrinsically relational ("highest/lowest element in a projection"). From this perspective, *minor phrase* and *major phrase*, often posited as separate categories, look like conceptual confounds: Only *phrase* is a category, it has several instantiations within a projection, among them a maximal and a minimal one; similarly for *word*.

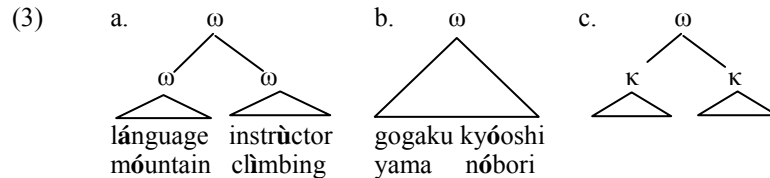
We show this kind of "categories-and-adjunction" system at work by examining the prosodic typology of Japanese compounds, an area of some interest where the sheer number of different prosodic types seems to demand multiple categories in the word-phrase area. Our goal is to demonstrate, on the contrary, that a restrictive system distinguishing just Φ and ω (besides ι) leads to an illuminating analysis of this complex area of facts, provided the syntax of prosodic adjunction is properly understood.

<sup>2</sup> We use this term here in order to be able to reserve "phrase" to refer to the lower ranges of the hierarchy that are the focus of this paper.

<sup>3</sup> For earlier arguments for the necessity of adjunction/recursion in prosodic structure, see Ladd (1986) and Kubozono (1988, 2005).

## 2. Internal Structure

A well-known difference between compounds in English and in Japanese, and between dynamic stress and pitch accent, involves stress subordination in English vs. accent deletion in Japanese. In the compound *language instructor*, the first word stress is elevated to main prominence status within the compound, but the second word stress, while downgraded to a secondary level, is not deleted. On the other hand, the compound *gogaku+kyóoshi* (composed of *gógaku* 'language' and *kyóoshi* 'instructor') ends up with a single accent (phonetically, a HL tone), on the second element—the lexical accent of the first member has disappeared without a phonetic trace. Previous analyses (Tanaka 2001, Ito and Mester 2003, etc.) have taken this to mean that there is a difference in internal structure. In an English compound each member is a separate prosodic word (3a), hence the main prominences of both members are preserved, whereas in Japanese the whole compound is a single prosodic word (3b), hence the accent on the first (non-head) member is lost.



Although positing a single  $\omega$  in Japanese compounds (3b) accounts straightforwardly for the deaccentuation of the first member, several questions remain unanswered regarding the details of the internal structure: Does the single  $\omega$  directly dominate the lower phonological constituents (foot, syllable) of the compound members? Or is there some other intermediate prosodic category  $\kappa$  (3c) that dominates each compound member?

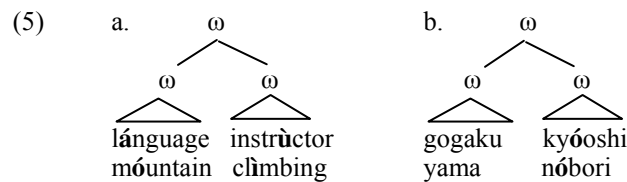
Comparison with the accentual patterns of the simplex words in (4) shows that not only does the accent of the first compound member disappear, but a junctural accent on the first syllable replaces whatever accent the second member has in isolation. Intuitively speaking, the result is that accent remains on the initial syllable in *kyóoshi*, moves to the initial syllable in *tamágo* and *musumé*, and is added to the unaccented word *nobori* (where "-" indicates unaccentedness).

### (4) Compound accent

		accent loss	junctural accent		
		↓	↓	cf. simplex word:	
gogaku	kyóoshi			gógaku	kyóoshi
nama	támago			náma	tamágo
hitori	músume			hitóri	musumé
yama	nóbori			yamá	nobori-

In order to assign the compound accent, however, the compound juncture needs to be identified. But how can this be achieved without giving the

compound members some prosodic status? The "indirect reference hypothesis" suggests that the appropriate reference units for the positioning of a phonological entity like pitch accent are phonological and not syntactic ones, which implies that the internal structure cannot be the flat structure in (3b), but needs some additional intermediate prosodic category as in (3c). Our proposal here is that just as in English, compound members in Japanese simply have prosodic word status (5b), and that the junctural accent is assigned by an accent alignment constraint. There is independent phonological evidence for the  $\omega$ -status of compound members involving velar nasalization and epenthesis (see Ito and Mester 1996, 1997), and further supporting phonetic evidence is likely to turn up.<sup>4</sup>



The difference between stress subordination in English and deaccentuation in Japanese is due not to a difference in prosodic structure, but to the fact that the Japanese pitch accent is a *head feature*: Each accent must be the head of some minimal prosodic phrase  $\Phi$ . This ensures that every minimal  $\Phi$  has at most one accent (any additional accent would not be a head), a property inherited by every category dominated by it ( $\omega$ , Ft,  $\sigma$ , and  $\mu$ ). The domain of accent, therefore, is the minimal  $\Phi$ .

There are several advantages to this new approach. First, junctural accent simply aligns with the left edge of the second  $\omega$ . Secondly, there is no category proliferation—no new phonological category is necessary between foot/syllable and prosodic word. In addition, (5b) observes the grammar-prosody alignment constraint demanding that the left/right edge of every morphological word correspond to the left/right edge of some prosodic word.

### 3. Descriptive Typology

Once we look at more complex compounds with internal structure (henceforth: "branching compounds"), an interesting variety of structures begins to unfold.<sup>5</sup> Take compounds built on the three elements X, Y, and Z. The first observation is that the direction of branching has a direct influence on accent (Kubozono 1988): Left-branching compounds (6a) have maximally one accent, located on the head (the second member)—the non-head (first member) is deaccented.

<sup>4</sup> The issue of universality vs. language-specificity of structure has a long history in syntax. For example, the idea that Japanese and other 'non-configurational' languages diverge from English in having a flat structure without a VP has not proved productive. As Saito and Hoji (1983) and others have shown, the real factors responsible for the observed differences lie much deeper.

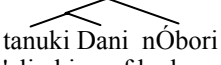
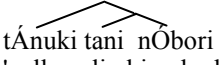
<sup>5</sup> We are here disregarding the internal structure of Sino-Japanese binomials like *ji+shin* 'earthquake', whose component bound roots lack independence and do not have  $\omega$ -status.

Right-branching compounds (6b) are not systematically deaccented, and hence can appear with two accents.

(6)	a. L(ef)t-branching: [[XY]Z] [[dai jishin] kÉehoo]	b. R(igh)t-branching: [X[YZ]] [hAnshin [dai shÍnsai]]
	'Great-earthquake warning'; 'Hanshin great-earthquake'	

Things become more interesting when we turn to compounds whose non-initial elements are native lexical items, which are subject to compound voicing (*rendaku*). The accent-*rendaku* correlations are summarized in (7), and illustrated with examples (see Ito and Mester 2003).

(7) Accent-*rendaku* correlations

L-branching: [[XY]Z] • <i>rendaku</i> on Y • deaccentuation 	R-branching: [X[YZ]] • no <i>rendaku</i> on Y • no deaccentuation 
tanuki Dani nÓbori 'climbing of badger valley'	tÁnuki tani nÓbori 'valley climbing by badgers'
/tánuki/ 'badger'; /tání/ 'valley'; /nobori-/ 'climbing'	

While *rendaku* implies deaccentuation, absence of *rendaku*<sup>6</sup> does not imply absence of deaccentuation. The R-branching type therefore has two subtypes, as shown in (8).

(8) Two types of R-branching compounds

R-branching: [X[YZ]] • no <i>rendaku</i> on Y	
• deaccentuation zenkoku kÚmi-ai	• no deaccentuation zÉnkoku sakura-mÁtsuri
'nationwide group-union'; 'nationwide cherry-festival'	

Finally, Kubozono, Ito and Mester (1997) show that the deaccenting non-*rendaku* cases have two subcases, as shown in (9): One with a compound-specific junctural accent (on the initial syllable of the second compound member), the other one retaining the accent structure that the second member has when it occurs by itself.

(9)	[X[YZ]] • no <i>rendaku</i> on Y, deaccentuation	
	• new junctural accent: [YZ] [denki] [kÁmi-sori]	• retention of [YZ] accent [hatsu] [kao-Áwase]
	'electric hair-shave (razor)', cf. <i>kami-sóri</i> ; <sup>7</sup> 'first face-(to-face)-meeting', cf. <i>kao-áwase</i>	

<sup>6</sup> I.e., in cases where *rendaku* is otherwise expected because all preconditions are fulfilled, see Ito and Mester (2003) for details.

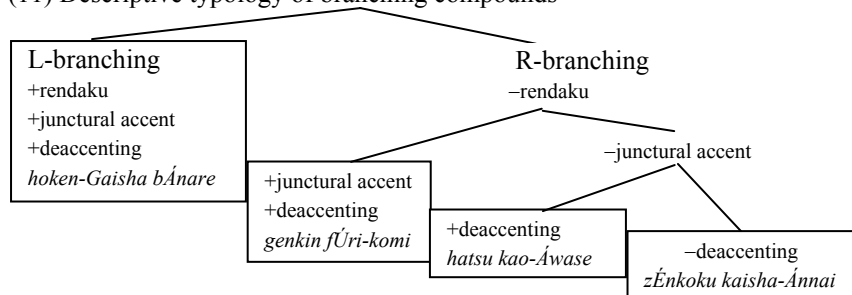
<sup>7</sup> Finally-accented *kamisori* is another variant.

The properties of the different kinds of branching compounds are summarized in (10) and expressed as a sequence of binary subcategorizations in (11).

(10) Properties of branching compounds

rendaku	Yes	No	No	No
junctural accent	Yes	Yes	No	No
deaccenting	Yes	Yes	Yes	No

(11) Descriptive typology of branching compounds<sup>8</sup>



#### 4. Prosodic Typology

Given the assumptions about prosodic constituent structure outlined earlier, these four types of compounds are assigned the structures in (12). Each elementary constituent of a compound is a  $\omega$ , and  $\omega$ -structure then projects upwards to parse the whole compound, until the phrasal level is reached.

(12) Prosodic typology of branching compounds

word compounds		phrasal compounds	
		mono-phrasal	bi-phrasal
<i>hoken-gaisha bÁnare</i>	<i>genkin fÚri-komi</i>	<i>hatsu kao-Áwase</i>	<i>zÉnkoku kaisha-Annai</i>

These structures are built out of just two categories,  $\omega$  and  $\Phi$ . Our goal is to show that the functional differentiation of *instances* of these categories (minimal, etc.) is sufficient for a precise and insightful analysis, so that no further distinctions between *categories* are warranted. Focusing first on the  $\omega$ -

<sup>8</sup> Glosses (from left to right): 'movement away from insurance companies'; 'cash transfer'; 'first face-to-face meeting'; 'nationwide corporate guide'.

dominated parts of these structures, we annotate (12) in terms of maximal and minimal instantiations of  $\omega$ , as in (13).

(13) Minimal and maximal projections of  $\omega$

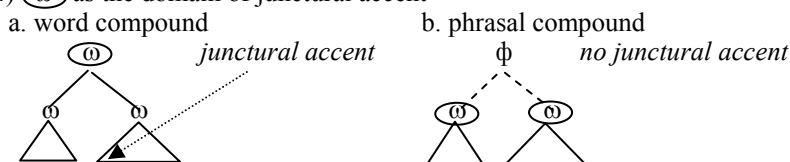
word compounds		phrasal compounds	
		mono-phrasal	bi-phrasal
a.		b.	
<i>hoken-gaisha bAnare</i>		<i>genkin fUri-komi</i>	
c.		d.	
<i>hatsu kao-Awase</i>		<i>zEnkoku kaisha-Annai</i>	

#### 4.1 Analysis

Rendaku is restricted to minimal  $\omega$ -projections and is excluded in higher projections—i.e., in positions which simultaneously initiate two  $\omega$ -constituents (potential rendaku-sites are marked as [+r] in (13)). This recaptures the essentials of our earlier analysis in Ito and Mester (2003) within the new framework of assumptions. Hence *kaisha*  $\rightarrow$  *gaisha* and *hanare*  $\rightarrow$  *banare* in (13a), but *kaisha* remains unchanged in (13d), where it begins a higher  $\omega$ -projection; *furi* in (13b) and *kao* in (13c) remains unchanged for the same reason.<sup>9</sup>

The next issue is the distribution of junctural accent, which is found in word compounds (14a), but not in phrasal compounds (14b).

(14)  $\omega$  as the domain of junctural accent



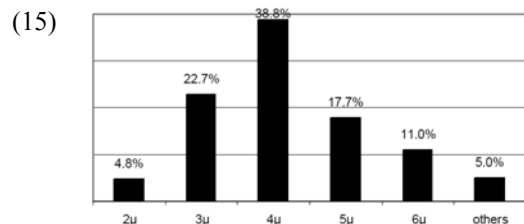
One way of expressing this is to identify the locus of compound accent with the internal juncture of a maximal  $\omega$ —the topmost node in (14a), and the second member in (14b) (since the first member will be deaccented, see below). In phrasal compounds (14b)/(13c,d), accent cannot be assigned at the highest compound juncture, and the whole form is "prosodically non-unified", in

<sup>9</sup> The elements *awase* and *annai* are also in [+r]-positions but are initially voiced anyhow, and *furi-komi* belongs to a large class of verb-verb compounds that never show rendaku on its second member for morphological reasons.

Kubozono's (1988) terminology, contrasting with the prosodically cohering word-compounds.<sup>10</sup>

What, then, determines whether a compound is a word compound or a phrasal compound? The crucial factor is simply the prosodic length of the second member (Kubozono, Ito and Mester 1997): If it exceeds two bimoraic feet ( $4\mu$ ), it cannot be the head of a word compound, and the whole form must be parsed as a phrasal compound. This restriction on the prosodic head is responsible for the contrast between the  $\omega$ -parsing in *nankyoku-tAnken* 'Antarctic exploration' (head *tanken*  $\leq 4\mu$ ) and the  $\Phi$ -parsing in *nankyoku-tankentai* 'Antarctic expedition' (head *tankentai*  $>4\mu$ ) with no junctural accent.

Why would there be such a length restriction on heads of prosodic words? There is considerable evidence that two feet is some kind of size limit for canonical words in Japanese: (i) They are canonical in the sense that they are the most frequent word type in the lexicon. The percentage distribution for word types of different lengths in a standard pronunciation dictionary is given in (15) (after Sakano 1996 and Kozasa 2000). (ii) Far more than words of all other lengths,  $4\mu$ -words show a strong tendency to be unaccented (see Oda 2006), where unaccentedness has been interpreted as a hallmark of unmarkedness (Tanaka 2001). (iii) There is a sharp difference in the amount of final lengthening between  $4\mu$ -sequences that constitute phonological words vs. longer sequences, indicating that this is a significant prosodic divide (Mori 2002). (iv) A  $4\mu$ -template defines the maximal size of Japanese truncations (Ito 1990, Ito and Mester 1992) and language game forms (Tateishi 1989, Ito, Kitagawa and Mester 1996), indicating again that this shape acts as a canonical form.



Following earlier work (see the references just cited as well as further development in Ussishkin 2000, 2005), we view the two-foot limit reflected in this kind of evidence as a consequence of a more basic factor, namely a constraint requiring words to be prosodically binary. With bimoraic foot parsing, any form longer than four moras ends up with more-than-binary branching:  $[(\mu\mu)_1(\mu\mu)_2\mu_3]$ , etc.

Intuitively speaking, then, we can think of the restriction on heads of prosodic words as a restriction on adjunction. Adjunction is possible only to canonical prosodic words—here, those that fulfill binarity. Recruiting an approach developed in Mester (1994, 6-8) (see also Hewitt 1994 and Selkirk 2000, 244) for our purposes, we formulate distinct constraints on the maximal

<sup>10</sup> Cf. also Oda 2006 for a different proposal in a framework with multiple category distinctions ("metrical word" vs. "prosodic word", etc.) but starting with a similar idea (using "word" and "extended word").



and minimal size of prosodic constituents. For a prosodic category  $\kappa$ , this means distinguishing  $\text{MAXBIN}(\kappa)$  and  $\text{MINBIN}(\kappa)$ , as in (16a). As a derivative constraint, we refer to their combination as  $\text{BIN}(\kappa)$ . For  $\kappa = \sigma, \text{Ft}, \omega, \Phi$ , etc., this yields the family of (independently rankable) constraints in (16b).<sup>11</sup>

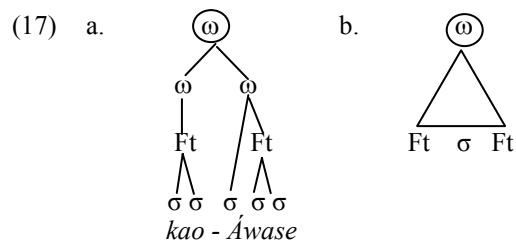
(16) a. Schema for binarity constraints:

$\text{MaxBin}(\kappa)$ $\kappa$ is maximally binary.	$\text{MinBin}(\kappa)$ $\kappa$ is minimally binary.	$\text{Bin}(\kappa)$ $\kappa$ is exactly binary.
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b. Family of binarity constraints:

$\text{MaxBin}(\sigma, \text{Ft}, \omega, \Phi)$	$\text{MinBin}(\sigma, \text{Ft}, \omega, \Phi)$	$\text{Bin}(\sigma, \text{Ft}, \omega, \Phi)$
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In adjunction structures with multiple  $\omega$ -nodes, a question of detail needs to be settled concerning the evaluation of a constraint like  $\text{MAXBIN}(\omega)$ . Does the top node in a structure like (17a) fulfill or violate  $\text{MAXBIN}(\omega)$ ?



Both views have their merits, and probably their uses. As the facts show, the sense of binarity needed, in the case of adjunction structures, is the one that measures complexity in terms of immediate daughters *below* the level where adjunction takes place, i.e., as in (17b). (17) violates  $\text{MAXBIN}(\omega)$  in this sense because it contains two feet and a syllable. There is an abstract connection here to the concept of *segments* of a category in syntactic adjunction structures (May 1985). From this perspective, the whole  $\omega$  is one complex category, its content is measured in terms of properly contained prosodic categories—i.e., its segments do not count for structural binarity.

Moving towards an OT analysis, the operational metaphor that adjunction is only possible to canonical words can be rationalized as expressing the fact that constraints enforcing canonicity (here, binarity constraints) have specific instantiations for heads, an instance of positional markedness. The operative constraint, then, is (18).<sup>12</sup>

(18)  $\text{MaxBin}(\text{Head}(\omega))$ : Heads of prosodic words are maximally binary.

<sup>11</sup> Extending  $\kappa$  to include the mora seems prosodically incorrect, another indication that this atom of length/weight might not be a genuine member of the prosodic hierarchy (see Ito and Mester 1992, 48 for related discussion).

<sup>12</sup> Cf. also the approach to head-dependent asymmetry developed in Dresher and van der Hulst (1998), where dependents cannot exceed heads in complexity and visibility.

To simplify terminology, let us call second members "super-binaries" if they exceed the MAXBIN( $\omega$ )-limit. Ranked above a WRAP-constraint (Truckenbrodt 1999) insisting that every morphological word constitutes a  $\omega$ , tableau (19) shows how (18) ensures that a super-binary in head position results in phrasal compounds.

(19) Align-Left ( $\omega$ , MWd) » MaxBin(Head( $\omega$ )) » Wrap (MWd,  $\omega$ )

/\{hatsu\{\{kao\}\{awase\}\}\}/	Align-Left ( $\omega$ , MWd)	MaxBin (Head( $\omega$ ))	Wrap (MWd, $\omega$ )
a. $\mathcal{F}$ [(hatsu) $\omega$ ((kao) $\omega$ (Áwase) $\omega$ ) $\omega$ ] $\phi$			*
b. ((hatsu) $\omega$ ((kÁo) $\omega$ (awase $\omega$ ) $\omega$ ) $\omega$		*!	

The structural consequence of the ranking in (19) is that a super-binary head is closed off as a maximal  $\omega$ , and the whole compound can only be parsed as a phrase. Since the domain of junctural compound accent is the maximal  $\omega$ , the accentual consequence is that no such accent can be assigned to the whole compound (\**hatsu kÁo-awase*), and the accent (or lack thereof) of the head determines the accentuation of the compound (*hatsu kao-Áwase*).

Top-ranking ALIGN-LEFT( $\omega$ , MWd) keeps the power of MAXBIN(HEAD( $\omega$ )) in check and forestalls aggressive prosodic optimization that would break up super-binary simplex words into separate prosodic words without morphological licensing.<sup>13</sup>

(20) /\{kurisumasu\}/	Align-L ( $\omega$ , MWd)	MaxBin (Head( $\omega$ ))	Wrap (MWd, $\omega$ )
a. $\mathcal{F}$ (kurisÚmasu) $\omega$		*	
b. ((kuri) $\omega$ (sÚmasu) $\omega$ ) $\omega$	*!		

#### 4.2 Illustrations

We first turn to the case of 'normal' junctural accent. Various types of examples appear in (21).

(21) Binary  $\omega_2$ : ( $\omega_1 \omega_2$ ) $\omega$

	in isolation:	as second member: junctural accent	
a.	(hataraki $\bar{}$ )	((shita) (bÁtaraki))	'under-worker', 'assistant'
b.	(tama+négi)	((aka) (tÁma+negi))	'red (round)-onion'
c.	(gekijoo $\bar{}$ )	((kokuritsu) (gÉkijoo))	'national theater'
d.	(afurika $\bar{}$ )	(minami) (Áfurika)	'south Africa'
e.	(paso+kon $\bar{}$ )	((nooto) (pÁso+kon))	'notebook PC'

<sup>13</sup> This is not to say that such aggressive optimization never occurs, cf. the morphologically unmotivated 'pseudo-compound' structures encountered in some situations (see Ito, Mester and Plag 2004, Karvonen 2004, and Munro and Riggle 2006 for examples).

The second members of the compounds in (21) observe MAXBIN (4 $\mu$ =two bimoraic feet). Therefore the entire compound is a word compound (see (14)), and junctural accent appears as expected. The prediction is borne out irrespective of the second member's lexical class (native (21a,b), Sino-Japanese (21c), or foreign (21d,e)), and irrespective of its internal  $\omega$ -structure (simplex (21a,c,d) or complex (21c,e)). The only requirement is that the second member observe MAXBIN.

On the other hand, the second members of the compounds in (22) violate MAXBIN. This forces a parse as a phrasal compound, and no junctural compound accent is assigned.

(22) Super-binary  $\omega_2$ :  $[\omega_1 \omega_2]_{\Phi}$

	in isolation	as second member: <i>no</i> junctural accent	
a.	(mono+gÁtari)	[genji (mono+gÁtari)] *(genji (mÓno+gatari))	'Genji story-telling', i.e., 'Tale of Genji'
b.	(kokuritu+gÉkijoo)	[shin (kokuritu+gÉkijoo)] *(shin (kÓkuritsu+gekijoo))	'new national theater'
c.	(jidÁi+geki)	[kinyoo (jidÁi+geki)] *(kinyoo (jÍdai+geki))	'Friday period-drama'
d.	(kokín+shuu)	[shin (kokIn+shuu)] *(shin (kÓkin+shuu))	'new Kokin- anthology' <sup>14</sup>
e.	(tanken+tai)	[nankyoku (tanken+tai)] *(nankyoku (tÁnken+tai))	'Antarctic explore- group (expedition)'
f.	(sakushi+ka)	[dai (sakushi+ka)] *(dai (sÁkushi+ka))	'great lyric-person (lyricist)'
g.	(rosanzÉrusu)	[minami (rosanzÉrusu)] *(minami (rÓsanzerusu))	'south Los Angeles'
h.	(asuparágasu)	[shiro (asuparáÁgasu)] *(shiro (Ásuparagasu))	'white asparagus' <sup>15</sup>
i.	(kariforunia <sup>-</sup> )	[kita (kariforunia <sup>-</sup> )] *(kita (kÁriforunia <sup>-</sup> ))	'northern California'

Instead, the overarching generalization in (22) is that the accentual structure of the whole compound is a direct reflection of the accentual structure of the super-binary second member. The latter can arise in multiple and complex ways:

(i) In (22a,b), the accent position within the super-binary second member, a compound itself, is due to junctural accent: (*gekijoo*<sup>-</sup>) 'theater' is unaccented and receives junctural compound accent in (*kokuritsu+gÉkijoo*) 'national theater', which the larger compound (*shin kokuritsu+gÉkijoo*) retains.

(ii) The complex second members in (22c-f) involve morpheme-specific accent requirements—preaccenting (22c,d) and deaccenting (22e,f). Because these specific requirements take precedence over the general junctural compound accent, the second compound member may turn out to be unaccented: Thus (*tái*) in (22e) is deaccenting, yielding unaccented

<sup>14</sup> The abbreviation *shin kókin* appears with the junctural accent since the (shortened) head fulfills MAXBIN.

<sup>15</sup> Cf. also the abbreviation *shiro ásupara* with the expected junctural accent.


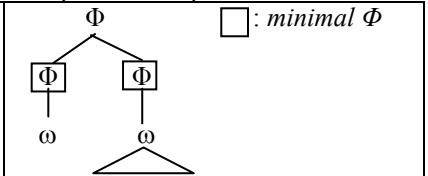
(*tanken+tai*). The larger compound (*nankyoku tanken+tai*) retains the (unaccented) accentual structure of the second member.

(iii) (22g-i) show that the right-branching morphological structure in itself is not the key factor here. The same MAXBIN-generalization carries over to these loanword compounds whose second members are simplex but super-binary, as pointed out in Kubozono, Ito, and Mester (1997, 160-162). Loanwords tend to be long because of phonotactically motivated epenthetic vowels, and, if super-binary (e.g., *asuparÁgasu*), they are themselves already closed off as maximal words when they occur as second members. The larger compound retains the accentual structure of the second member, be it accented as in (22g) (*minami rosanzÉrusu*) or unaccented as in (22i) (*kita kariforunia*). (22a-i) again demonstrate that the MAXBIN-generalization holds across lexical classes—native (22a), Sino-Japanese (22b-f), and Foreign (22g-i).

(iv) The compound (*dai sakushi+ka*) in (22f) deserves special mention. The bound morpheme *-ka* 'person' is deaccenting, resulting in unaccented (*sakushi+ka*). Kubozono, Ito, and Mester (1997, 161) point out that *sakushi-ka*, despite being four moras, count as nonbinary, because of an alignment constraint aligning morpheme edges with foot edges. Rather than the binary parse *\*(saku)(shi+ka)*, which straddles morpheme boundaries, the prosodic structure must be the super-binary (*saku)(shi)+(ka)*, with monomoraic feet on *shi* and *ka*.<sup>16</sup>

### 4.3 Remaining issues

Finally, as already indicated in (12) above, Japanese has two types of phrasal compounds: (23a), where a morphological input is parsed as a *mono-phrasal* compound, with  $\Phi$  directly dominating the two  $\omega$ -members, and (23b), where it is parsed as a *bi-phrasal* compound with each  $\omega$ -member having  $\Phi$ -status. We have so far dealt with mono-phrasal compounds. In the bi-phrasal variety, no deaccentuation takes place, and two pitch accents can occur, as in (23b).<sup>17</sup>

(23) a. mono-phrasal compound	b. bi-phrasal compound
	
<p><i>chihoo kensatsÚ-choo</i> 'local prosecutor office'</p>	<p><i>chihÓo kookyoo-dÁntai</i> 'local public organization'</p>

Our understanding of the rules that determine which kinds of compounds with super-binary second members take which kind of structure is

<sup>16</sup> Such unaccented compounds also show, incidentally, that deaccentuation of the first member cannot in general be an OCP effect, as erroneously claimed by Ito and Mester (2003, 54) and others.

<sup>17</sup> Cf. also interesting contrasts between word compounds and bi-phrasal compounds such as *zenkoku hÓosoo* 'nation-wide broadcast' (*\*zÉnkoku hÓosoo*) vs. *zÉnkoku dejitaru hÓosoo* 'nationwide digital broadcast'.

still incomplete. Broadly speaking, the reason for a bi-phrasal parse can lie either in the first or in the second member. One descriptive generalization in earlier work (Kubozono, Ito and Mester 1997) is that bi-phrasal compounds arise when the second member exceeds three feet, as in (23b), perhaps reflecting a threshold where phrasal parsing is triggered. On the other hand, certain first members, such as *móto* 'former', are intrinsically marked as phrasal (Poser 1990), perhaps for semantic reasons, and their sister members become phrasal by parallelism. This makes it possible for the compound to appear with two accents, as in *mÓto dai-tÓoryoo* 'former president' (in effect, to a large extent independent of the length of the second element).

The situation is obscured by the additional influence of pragmatic factors (Kubozono 1988, Vance 1994), frequent cases of variation such as (24a), which can be realized with either one or two accents, and by the fact that a bi-phrasal parse is sometimes found even when the second member is not longer than three feet, as in (24a,b).

- |      |    |  |  |
|------|----|--|--|
| (24) | a. | sÉkai shin-kÍroku~sekai shin-kÍroku      | 'world new-record'                               |
|      | b. | kÁnsai shin-kÚukoo<br>kÓohaku uta-gÁssen | 'Kansai new-airport'<br>'red-white song-contest' |

## 5. Conclusion

We have proposed a simplified hierarchy distinguishing only word ( $\omega$ ) and phrase ( $\Phi$ ) as categories below the intonation group, but allowing adjunction structures with a concomitant distinction between maximal and minimal projections. This is sufficient to provide a detailed and principled analysis of the rather complex prosodic typology of Japanese compounds. Rendaku is restricted to minimal projections of  $\omega$ , junctural compound accent applies to maximal projections of  $\omega$ , and accents are head features associated with minimal projections of  $\Phi$  as their domains.

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