

Title: On the existence of root-initial-accenting suffixes: An elicitation study of Japanese [-zu]

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Abstract: Most known cases of affix controlled accentuation patterns involve local accent assignment: prefixes assign root-initial accents whereas suffixes assign root-final accents. In this paper we document the non-local accentuation behavior of [-zu], a recently-emerged suffix in Japanese which an elicitation study reveals to be productively root-initial-accenting. We present a phonological analysis of the [-zu] data, showing that standard theories of morpheme realization predict the existence of such a suffix. The existence of [-zu] therefore fills what would otherwise be an undesirable typological gap.

1. Introduction

Many languages have pre- and/or post-accenting affixes, which insert an accent onto the base that they attach to. For example, Japanese has a post-accenting prefix [ma-], which inserts an accent on the root-initial syllable as in (1), and a pre-accenting suffix [-ke], which inserts an accent on the root-final syllable as in (2). (In this paper we represent an accent with an acute accent mark; words without an accent mark are unaccented.)

(1) [ma-] ‘truly’: post-accenting prefix (Poser 1984: 78-79).

[maru] ‘round’ [mam-máru] ‘truly round’

[sakasama] ‘downward’ [mas-sákasama] ‘truly downward’

(2) [-ke] ‘house of’: pre-accenting suffix (Poser 1984: 77).

[tokiwa] (surname) [tokiwá-ke] ‘Tokiwa’s house’

[míkami] (surname) [mikamí-ke] ‘Mikami’s house’

Nearly all known cases of pre- and post-accenting affixes (in Japanese and in other languages) insert their accents onto the syllable adjacent to the affix (Kurusu 2001: 210-211; Revithiadou 2008): prefixes assign base-initial accents whereas suffixes assign base-final accents, as exemplified in (1) and (2). Kurisu proposes a constraint Morph-Contiguity, which requires that an affix and the accent it introduces on the stem are realized in contiguous syllables. Revithiadou states that “[the accent introduced by post-accentuation and pre-accentuation] never lands further than the immediately neighboring syllable” (p.150). To summarize, affix-controlled accentuation

appears to always be local. However, as we will show in this paper, non-local pre-accentuation is possible, as is demonstrated by a recently-emerged derivational suffix [-zu] in Japanese, which assigns an accent to the root-initial syllable (in some phonological contexts).

The existence of [-zu] is interesting from a typological standpoint because there are few reported examples of non-local affix-controlled accentuation in any language. Its existence is also interesting for theoretical reasons, because nearly all mainstream theories of affix-controlled accentuation predict that non-local pre-/post-accentuation should be possible. For example, a number of proposals within OT use alignment constraints to determine locations of accents and tones (Akinlabi 1996; Alderete 2001b; Gordon 2003; Zoll 2003). These proposals, together with the standard assumption that an alignment constraint can be morpheme-specific (McCarthy and Prince 1993; Prince and Smolensky 1993 [2004]), predict the existence of initial-accenting suffixes, as we show below in detail. Therefore, if root-initial-accenting suffixes did not exist, standard theories would face a typological gap. The data that we report fills this gap.

This paper is organized as follows. Section 2 presents the empirical generalizations about [-zu]'s accentual behaviors based on already-existing data and an elicitation study. Section 3 presents an analysis of these data using Optimality Theory (Prince and Smolensky 1993 [2004]). Section 4 discusses issues arising from our analysis, including other reported examples of opposite-edge pre-/post-accentuation and the predicted possibility of such patterns in theories of morphologically-governed accentuation other than the one we employ. Section 5 offers brief concluding remarks.

2. Elicitation study: Accentual alternations in [-zu]-words

2.1. Introduction: Background and already-existing data

First a brief background on Japanese accents. Accentedness is contrastive in Japanese; it has minimal pairs like [haʃi] 'edge' (unaccented) and [háʃi] 'chopstick' (accented on the initial syllable). The accent is phonetically realized as a High-Low pitch fall, and unaccented words do not receive such a fall. In this paper, we assume, following Haraguchi (1977), McCawley (1968)

and Poser (1984), that accents are phonological diacritics which are phonetically realized as an HL contour (cf. Pierrehumbert and Beckman 1988 and Pulleyblank 1984 for a purely tonal approach to the representation of accents; nothing in our analysis, however, crucially hinges on adopting one rather than the other of these representational approaches). Japanese words can also contrast in placement of an accent; e.g. [háji] ‘chopstick’ and [hají] ‘bridge’ (in the latter case, the L tone is realized on the first mora of the following particle/word in actual multiword utterances). Although Japanese does show minimal triplets like the one mentioned here, accent placement is predictable in some contexts: for example, morphologically derived words as well as loanwords often show predictable accent patterns (see Kubozono 2008 for a review).

As we will show below, the accent of words with [-zu] is (mostly) predictable. The suffix [-zu] has emerged in Japanese through a borrowing of the English plural *-s*, which is usually accompanied by lengthening of the root-final syllable if it is originally open and short (e.g. [sama] ‘Mr./Ms.’ → [samaa-zu]).¹ The semantics of this new suffix are distinct from those of the plural: a word [X-zu] formed with this suffix can mean either “a group of people having attribute X” or “a group of people interested in X”. The new [-zu] suffix is particularly often employed as a way of forming the names of bands, comedy groups, sports teams, and the like, as exemplified in (3).

(3) Some examples of [-zu]-words.

[ántoraa]	‘antler’	→	[ántoraa-zu]	(name of a soccer team)
[hoéeru]	‘whale’	→	[hoéeru-zu]	(name of a baseball team)
[suwároo]	‘swallow’	→	[suwároo-zu]	(name of a baseball team)
[dóragon]	‘dragon’	→	[dóragon-zu] ²	(name of a baseball team)
[béisutaa]	‘bay star’	→	[béisutaa-zu]	(name of a baseball team)

[φáítaa]	‘fighter’	→	[φáítaa-zu]	(name of a baseball team)
[báφφaroo]	‘buffalo’	→	[báφφaroo-zu]	(name of a baseball team)
[maríiN]	‘marine’	→	[maríiN-zu]	(name of a baseball team)
[kʰándii]	‘candy’	→	[kʰándii-zu]	(name of a band)
[tómii]	(first name)	→	[tómii-zu]	(name of a comedy group)
[d̄zánii]	(first name)	→	[d̄zánii-zu]	(name of a music production company)

Some data show that suffixation of [-zu] is associated with the placement of an accent on root-initial syllables, especially when the root is unaccented or finally-accented. There are a few established examples of comedian and baseball team names in which [-zu] is initial-accenting, as in (4).

(4) Established [-zu] forms showing initial-accenting.

[raíon]	‘lion’	→	[raíon-zu]	(name of a baseball team)
[tonneru]	‘tunnel’	→	[tónneru-zu]	(name of a comedy group)
[samá]	‘Mr./Ms.’	→	[sámaa-zu]	(name of a comedy group)
[dorón]	‘disappearing’	→	[dóron-zu]	(name of a comedy group)

We also have documented several new examples of initially accented [-zu]-words in recent popular media, as in (5).

(5) Documented [-zu]-forms showing initial-accenting in popular media.

[awá] ‘bubble’ → [áwaa-zu]
(SUNTORY TV commercial, January 2008)

[heppoko] ‘weak’ → [héppokoo-zu]
(Sword World drama CD, published by Frontier Works, July 2007)

[boŋkura] ‘a blockhead’ → [bóŋkuraa-zu]
(Azumanga Daioo, 13th story, J.C. Staff, Terebi Tokyo, 2002)

[gintama] (name of a comic book) → [gíntamaa-zu]
(Gintama, second series 1st story, Sunrise, Terebi Tokyo, 2007)

These examples show the initial accenting behavior of [-zu]-words. Moreover, in the data presented above, [-zu] seems to put an initial accent on unaccented and final-accented roots as in (4) and (5), whereas it keeps roots’ accents when they appear on non-final syllables as in (3). In order to further verify the productivity of [-zu]’s initial-accenting behavior and in order to investigate in which environments we observe the initial-accenting pattern, we elicited [-zu]-suffixed forms of three classes of Japanese words. These data form the basis of our phonological analysis.

2.2. Method

2.2.1. *Speakers.* Our consultants were sixteen native speakers of Japanese. Some of these speakers participated in this study voluntarily without any compensation; others received a \$5 gift card for their time. Although the informants are from different areas of Japan (1=Ishikawa, 2=Yamanashi, 3=Yamanashi, 4=Tokyo, 5=Tokyo, 6=Tokyo, 7=Tokyo, 8=Tochigi, 9=Kochi, 10=Tokyo, 11=Tokyo, 12=Tokyo, 13=Chiba, 14=Kobe, 15=Wakayama, 16=Kagawa), all of them were familiar with Standard Tokyo Japanese, in particular with a speech style common among young speakers in which the formation of [-zu]-words is productive.

2.2.2. *Stimuli.* We first created the stimulus list based on a Google search for words containing the [-zu] suffix. We then added some roots so that the list includes roots of various phonological shapes. Our consultants were previously unfamiliar with most or all of the [-zu]-forms of these roots, so our elicitation study can be regarded as a (psuedo-)wug-test (Berko 1958). The list included various Japanese roots of three kinds: unaccented roots, roots with an accent on the final syllable, and roots with a non-final accent. All of our stimuli contained at least two syllables since for monosyllabic roots, we cannot distinguish derived initial accents from the default antepenultimate mora accent (for discussion of default Japanese accents, see below). We did not include initially accented roots either, because if [-zu]-forms of these roots were produced with initial accent, it would be impossible to tell whether this was due to the influence of [-zu], or was simply retention of the root's original accent.

2.2.3. *Procedure.* We presented our consultants with a randomized list of unsuffixed words and corresponding [-zu]-words with vowel lengthening written in Japanese orthography. We included root-final vowel lengthening in our stimuli to ensure that the consultants would treat [-zu] as a group-name suffix, rather than the Japanese rendition of the English plural suffix. In the instructions, we also asked them to take the [-zu]-words as proper names of bands or comedy groups, and not as plural forms. For each pair of root and the corresponding [-zu]-word, we asked how they would pronounce each form. Those who were familiar with accent transcription — Japanese teachers and speakers with linguistic training — were asked to transcribe their speech themselves. For those who were not familiar with accent transcriptions, the first author

transcribed their speech. Consultants were asked to tell us if they felt uncertain about their renditions of any of the [-zu]-words. We also asked them to tell us all possible pronunciations of the stimuli, in the event that they judged more than one pronunciation to be possible.

2.3. Results

Out of the sixteen speakers, four of them (Speakers 13-16) predominantly assigned an accent on a syllable containing the antepenultimate mora in the word (e.g. [usagi-i-zu]).³ In loanwords borrowed into Japanese, accents predominantly fall on this syllable (Haraguchi 1991; Katayama 1998; Kubozono 1995, 2006a, 2008; McCawley 1968; Shinohara 2000; Suzuki 1995), and we assume that these four speakers are following the same default accentuation pattern in their productions of [-zu]-words. As these speakers show little root-initial accentuation in [-zu]-suffixed forms, we will focus on the pronunciations of the other twelve speakers.

Table 1 shows the results for unaccented roots for the remaining twelve speakers.

Table 1: Accents of [-zu]-words attached to unaccented roots. Notations: ini = initial accent; AP = antepenultimate mora accent; PAP=preantepenultimate mora accent; PPAP=prepreantepenultimate mora accent. “?” is added for cases in which the speakers were unsure about their pronunciations. “~” represents optionality. When a consultant has two responses listed separated by a ‘~’, the first one listed is their first choice. “--” indicates that the speaker’s pronunciation of the bare root differs from our classification of the root’s accent status (i.e., in this table, pronouncing the bare root with an accent). Glosses: rabbit, car, blog, baby monkey, coward, weak, paddybird, antenna, bandana, do one’s best, thin, Sakuragi (surname), Yanagiba (surname).

Speakers:	1	2	3	4	5	6	7	8	9	10	11	12
[usagi]	ini	ini	ini	ini	ini	ini	ini	ini	AP~ini	ini	ini	ini
[kuruma]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini
[burogu]	ini	ini	ini	ini	ini	ini	ini	ini~AP	AP	ini	ini	AP
[kozaru]	ini	ini	ini	ini	ini	AP	ini	AP	AP	AP	ini	--
[hetare]	ini	ini	ini	--	ini	--	ini	ini~AP	--	ini	--	--
[çiriki]	ini	ini	ini	ini	ini	ini	ini	AP	AP (?)	ini	ini	ini
[bunt̃oo]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini~AP	ini	ini
[heppoko]	ini	--	ini	ini	AP(?)	ini	AP	ini	ini	ini~AP	Ini	AP
[antenna]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	AP	ini
[bandana]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	AP	AP~ini
[gambari]	ini	ini	ini	ini	ini	ini	ini	ini~AP	AP~ini	ini	AP	AP
[perapera]	ini	--	ini	ini	ini	AP	ini	AP~PPAP	ini	AP	AP	ini
[sakuragi]	ini	ini	PAP~ini	ini	ini	PAP	ini~AP	AP~ini(?)	AP~ini(?)	ini	ini	AP
[janagiba]	ini	ini	PAP~ini	ini	ini	ini	ini	AP~ini(?)	AP~ini(?)	ini	AP	AP

In Table 1 we observe that with a few exceptions, speakers produced the [-zu]-forms with accents either on the initial (e.g. [çirikii-zu]) or on the antepenultimate mora (e.g. [çirikii-zu]) in the word, the latter of which is the default accent placement in loanwords (see above). The initial position is not the default location of accent in the language, and other pre-accenting suffixes in the language (e.g. [-ke] in [2]) place an accent on the root-final syllable. Table 1 thus shows that [-zu] has the idiosyncratic property of triggering initial accent.

Next, Table 2 illustrates the results for final accented roots.

Table 2: Accents of [-zu]-words derived from final-accented roots. Pr(AP) represents antepenultimate mora accent, which can also be considered as preservation of root accents (see text for explanation). Glosses: trash, bad, joke, cute, fun, teacher, noisy.

Speakers:	1	2	3	4	5	6	7	8	9	10	11	12
[gomí]	ini	ini	ini	ini	ini	ini	ini	Pr(AP)~ini	Pr(AP)~ini	Pr(AP)~ini	ini	ini
[damé]	ini	ini	ini	ini	ini~Pr(AP)	ini	--	ini~Pr(AP)	ini	ini	ini	ini
[d̥ʒoodán]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini
[kawáfii]	ini	--	Pr(AP)	Pr(AP)	ini	ini	ini	ini	Pr(AP)	Pr(AP)	Pr(AP)	Pr(AP)
[tanofíi]	ini	ini	ini	ini	ini	ini	ini	ini	Pr(AP)	Pr(AP)	ini	ini
[sensée]	ini	ini	ini	ini	ini	ini	ini	ini	Pr(AP)	ini	Pr(AP)	Pr(AP)
[urusée]	ini	ini	ini	ini	ini	ini	Pr(AP)	Pr(AP)~ini	Pr(AP)~ini	Pr(AP)~ini	Pr(AP)	Pr(AP)

With final-accented roots, Speakers 1-7 predominantly prefer initial accent in the [-zu]-form. However, Speakers 8-12 show a number of antepenultimate mora accent responses as well. These antepenultimate mora responses can be taken either as the emergence of the default accentuation or the preservation of root accents. In addition to its accentual effects, [-zu] triggers lengthening of a root-final vowel: e.g. [gomi] ~ [gomii-zu]. Because of this lengthening, the final mora of a root like [gomí] forms the antepenultimate mora in the corresponding [-zu]-form ([gomii-zu]). Thus preserving the root's accent and default accent assignment both result in the antepenultimate mora accentuation.

Despite this ambiguity, we regard the appearance of antepenultimate mora accents as preservation of the underlying root accent, rather than — or perhaps in addition to — the default accentuation, because antepenultimate-accent responses are more frequent for final accented roots than they were for unaccented roots. Speakers 8-12 chose antepenultimate mora accents as their first choice 37.9% of the time for unaccented roots (25/66) but 51.4% of the time for final accented roots (18/35).

Finally, we present the results for roots with non-final accents in Table 3.

Table 3: Accents of [-zu]-words derived from roots with non-final accents. pre=preservation of root accents. Glosses: bar, peaceful, suddenly, painting, too relaxed, purple, seal, hurricane, machine gun, boy.

Speakers:	1	2	3	4	5	6	7	8	9	10	11	12
[nomíja]	ini	ini~prepre	ini	ini	pre	ini	pre	AP~ini	ini	pre	pre	
[mattári]	ini	ini	ini	ini	ini	ini	ini	ini	ini~pre	ini	ini	ini
[çokkóri]	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini	ini
[oékaki]	pre	pre	pre	pre	pre~inipre	ini	pre	pre	pre	pre	pre~ini	
[nootéŋki]	pre	pre	pre	AP	pre~inipre	pre	pre	pre	pre	pre	pre	pre
[murásaki]	pre	pre	pre~iniini	pre	pre	pre	pre	pre~APpre	pre	pre	pre	pre
[azáraʃi]	pre	pre	pre	pre	ini	pre	ini	pre	pre	AP	pre	pre~ini
[harikéen] ⁴	pre	pre	ini	pre	pre~inipre	pre	pre~inipre~ini	pre	pre	pre	pre~ini	

[maʃiŋgaN]	pre	pre	pre	pre	pre	ini	pre	pre	pre	pre	pre	pre
[otokónoko]	pre	pre	pre	AP	pre	pre(?)	ini	pre	pre	pre	pre	pre

We observe that speakers mostly preserve root-accents, except for the first three items. Concerning these three exceptional items, they are morphologically complex (/nomi+ja/ ‘bar’, /mata+ri/ ‘peaceful’, and /çoko+ri/ ‘suddenly’) and the accents of these stems are arguably those of affixes. The fact that the accents of these three items are affixal may be responsible for their special behavior. Setting these items aside, then, when roots have their own underlying nonfinal accents, these accents generally surface, instead of [-zu]’s initial accent.

To summarize, we reach the following generalizations for the accentual properties of [-zu] in (6).

(6) Summary of the accentual properties of [-zu]:

(i) Unaccented roots receive an initial accent.

(ii) Final accented roots receive an initial accent. Speakers 8-12 show variation between sometimes assigning an initial accent and sometimes keeping the root accent.

(iii) Non-final accented roots show the preservation of root accents.

3. Analysis

This section presents an Optimality-Theoretic (Prince and Smolensky 1993 [2004]) analysis of the data summarized in (6). We start with our general assumptions about the representation of /-zu/ and Japanese foot structure. We then analyze unaccented roots, which show the initial accenting pattern. We move on to non-final accented roots, which exhibit the preservation of root

accents. Finally, we discuss final accented roots: we leave this case until the end because it shows the most complicated pattern with both within-speaker and between-speaker variation.

3.1. *General assumptions*

The affix [-zu] can cause two changes to the base of affixation: (i) it inserts an accent on the root-initial syllable, and (ii) it lengthens the root final vowel if the last syllable is short and open. We analyze these changes in a floating-autosegment approach (Akinlabi 1996; Gnanadesikan 1997; Goldsmith 1976; Lieber 1983, 1987; McCarthy 1983a, 1983b; Wolf 2007; Zoll 1996). We assume that the underlying representation of the suffix consists of /' μ zu/, i.e. a floating accent ('), a floating mora which causes vowel lengthening (μ), and the segmental component (/zu/). Since our focus here is on accent-placement in [-zu]-forms, we omit the floating mora from tableaux for the sake of visual clarity.

Before moving onto our analysis of [-zu], some comments on our assumptions about Japanese foot structure are in order. Following previous studies, we make the assumptions in (7).

(7) Assumptions about Japanese foot structure:

- (i) Every Prosodic Word contains at least one foot (McCarthy and Prince 1986; Selkirk 1995).
- (ii) Japanese feet are generally bimoraic and trochaic (Haraguchi 1991; Itô and Mester 1992; Poser 1990; Tateishi 1991).
- (iii) A word can contain multiple feet (Itô et al. 1996; Itô and Mester 1992; Katayama 1998; Kubozono 1995; Poser 1990).
- (iv) Maximally one foot per word gets an accent due to a culminativity restriction (Itô and Mester 2003).

- (v) Feet do not need to have an accent, because unaccented words exist and also because foot-based truncational compounds usually result in unaccented words (Itô et al. 1996; Itô and Mester 1992; Poser 1990).

Given all of the assumptions in (7), plus [-zu]'s effect of lengthening root-final vowels, the suffix [-zu] itself is always unfooted. Since the segmental portion [zu] of the suffix forms a light syllable, the lengthening of root-final short vowels means that [-zu]-words always end in a Heavy-Light syllable sequence, which will be footed as (H)_{Foot}L. The final L can neither form a foot of its own, since monomoraic feet are disallowed, nor can it form a foot with the preceding H syllable, since trimoraic feet are also disallowed (Itô and Mester 1992; see also Kubozono 1999, 2006b on final extrametricality in Japanese, which would result in the same (H)_{Foot}L parsing).

3.2. *Unaccented roots*

When [-zu] attaches to an unaccented root, [-zu]'s accent surfaces and appears at the left edge of the word. To account for the location of [-zu]'s accent, we propose that the morpheme is indexed to the Alignment constraint in (8) (McCarthy and Prince 1993).⁵

(8) ALIGN(accent, L, PrWd, L)_{-zu}:

- (a) The left edge of every accent must coincide with the left edge of some prosodic word.
- (b) Assign one violation mark for every accent belonging to the morpheme [-zu] for which (a) is not true.

This morpheme-specific constraint follows Pater's (to appear) convention about what structures an indexed markedness constraint applies to: a markedness constraint *XYZ indexed to morpheme M penalizes every instance of the phonological configuration XYZ in which some portion of XYZ belongs to M.

The alignment constraint directs [-zu]'s accent to initial syllables, if it surfaces at all (this constraint is vacuously satisfied if [-zu]'s accent is deleted). This alignment constraint must dominate whatever set of constraints which prefer the default antepenultimate mora accent (see Katayama 1998; Shinohara 2000; Suzuki 1995). We represent those constraints here with a cover constraint ANTEPENULT, which is violated whenever the accent is not located on a syllable containing the antepenultimate mora. The ranking $\text{ALIGN}(\text{accent}, \text{L}, \text{PrWd}, \text{L})_{\text{-zu}} \gg \text{ANTEPENULT}$ is illustrated in (9).⁶ In this paper we use combination tableaux (Prince 2002; McCarthy 2008). In the row for each losing candidate, a W indicates that the constraint favors the winner over that loser, and an L indicates that the constraint favors that loser over the winner. If there is no W or L in a cell in a loser row, then the constraint is indifferent between the winner and that loser.

(9) $\text{ALIGN}(\text{accent}, \text{L}, \text{PrWd}, \text{L})_{\text{-zu}}$ forces initial accenting.

/sakuragi-ʻ zu/	$\text{ALIGN}(\text{accent}, \text{L}, \text{PrWd}, \text{L})_{\text{-zu}}$	ANTEPENULT
→ [(sáku)ra(gii)-zu]		ʻ
~ a. [(saku)ra(gíi)-zu]	W ₁	L

As discussed in Section 3.1., we assume that the heavy syllable preceding [-zu] forms a foot for the reasons stated in (7). We also assume that initial accent is accompanied by a trochaic foot, although our analysis does not hinge on the presence of this foot.

$\text{ALIGN}(\text{accent}, \text{L}, \text{PrWd}, \text{L})_{\text{-zu}}$ must be specific to [-zu], i.e. it is a lexically-indexed markedness constraint (Flack 2007; Gouskova 2007; Ota 2004; Pater 2000, to appear), because the initial syllable is not the default location of accent in Japanese (cf. Fukazawa 1999; Itô and Mester 1999, 2001; Kraska-Szlenk 1997, 1999 who claim that only faithfulness constraints can be indexed). Without morpheme-specific alignment constraints like (8), [-zu]'s accent would be placed in the default accent location of the language — the syllable containing the antepenultimate mora. Because [-zu] docks its accent on initial syllables, rather than in the default location, the placement of [-zu]'s accents must be governed by a suffix-specific constraint: $\text{ALIGN}(\text{accent}, \text{L}, \text{PrWd}, \text{L})_{\text{-zu}}$.⁷

An interesting aspect of the behavior of [-zu] is that it contains two floating autosegments, the accent and the mora, which are attracted to different edges. The fact that the floating mora appears only at the right edge of the base (except when the base ends in a heavy syllable to begin with, in which case the floating mora is deleted) could be dealt with in a manner parallel to what we have proposed for the accent. Specifically, [-zu] might be indexed to an ALIGN-R constraint on the placement of moras; another possibility (Sprague 2005) is to call on CONTIGUITY constraints to account for the edge-local placement of floating moras. The pattern seen with [-zu]'s floating accent and floating mora being attracted to opposite edges may be novel. Given the central idea of autosegmental phonology (Goldsmith 1976) that tones, accents, features, etc. are autonomous representational objects rather than mere attributes of segments, two floating autosegments of different kinds, despite belonging to the same morpheme, could be subject to distinct pressures regarding at which edge they are docked. However, such cases have not previously been documented because there are relatively few plausible cases of affixes which contain multiple different floating autosegments in the first place. In Dinka (Andersen 1995; Flack 2007) there are verbal affixes which trigger mutations of tone, voice quality, and vowel length, but discerning any attraction of the various floating autosegments to different edges would be difficult, since Dinka verb forms are almost all monosyllabic. Thus here, as with our larger point about [-zu] filling the typological gap of an opposite-edge pre-/post-accenting affix, [-zu] is instantiating a pattern that is predicted by floating-autosegment approaches, but of which examples have not previously been forthcoming.

3.3. *Non-final accented roots*

We next move on to the analysis of non-final accented roots. Recall that when the root has a non-final accent, speakers prefer to keep the root accent. Due to the culminativity restriction stated in (7iv), when there are two underlying accents, one must delete. In case of [-zu], speakers prefer to keep root accents. We can capture this pattern by assuming that MAX(root accent) protects root accents from deletion (for MAX(root accent), see Alderete 2001b). This constraint must dominate MAX(zu accent), which protects [-zu]’s accent, as illustrated in (10).⁸

(10) The root accent wins: MAX(root accent) » MAX(zu accent).

/nootéŋki- ´ zu/	OCP(accent)	MAX(root accent)	MAX(zu accent)
→ [noo(téŋ)(kii)-zu]			´
~ a. [(nóo)(téŋ)(kii)-zu]	W ₁		L
~ b. [(nóo)(teŋ)(kii)-zu]		W ₁	L

OCP(accent) prohibits words with more than one accent — this constraint is undominated in Japanese, and as a result one accent must delete (Itô and Mester 2003; Kubozono 1997). Speakers preserve the root accents because of the ranking MAX(root accent) » MAX(zu accent).

3.4. *Final accented roots*

Finally, we turn to final accented roots. Unlike non-final accented roots which preserve their accents under [-zu]-suffixation, speakers prefer initial accents with final-accented roots. Therefore, there exists some pressure to replace root-final accents with initial accents. This pressure can be attributed to the constraint NONFIN(Ft) in (11) (see Kubozono 1995, 1997, 2006b; Kurisu 2005; Shinohara 2000 for the use of this constraint in Japanese nominal

compound patterns; see also Poser 1990 for final foot extrametricality which yields the same effect).

(11) NONFIN(Ft): Assign a violation-mark if the rightmost foot in the prosodic word contains an accent.

This constraint is conceptually related to, though distinct from, the earlier and better-known NONFINALITY constraint proposed by Prince and Smolensky (1993 [2004]), which assigns a violation-mark if the word-final syllable is parsed by a foot. These two constraints are related in that they both penalize the presence of various kinds of prosodic prominence at or near the right edges of words.

To see why this constraint deletes root-final accents in [-zu]-words, recall that these words have the prosodic structure [...(H)_{Ft}-zu] since the root-final syllable is always heavy, making it impossible to foot the final light syllable [zu]. As a result, the root-final syllable in a [-zu]-word always coincides with the word's rightmost foot. Therefore, if the root has an underlying accent on the root-final syllable, that accent will appear in the rightmost foot of the PrWd if it is preserved, violating NONFIN(Ft); e.g. /gomí/ → go(mí)-zu. Therefore, deletion of root-final accents will occur in [-zu]-words if NONFIN(Ft) dominates MAX(root accent), as shown in (12) (We discuss the ramifications of this ranking for Japanese phonology in general in Section 3.5.2).

(12) The root accent is deleted to satisfy NONFIN(Ft); [-zu]’s accent surfaces instead.

/gomí- ‘ zu/	NONFIN(Ft)	MAX(root accent)	MAX(zu accent)
→ [(gó)(mii)-zu]		’	
~ a. [(go)(míi)-zu]	W ₁	L	W ₁
~ b. [(go)(mii)-zu]		’	W ₁

As illustrated in (12), with the ranking NONFIN(Ft) » MAX(root accent), the root-final accent is deleted, and [-zu]’s accent surfaces instead.⁹ As a result, due to ALIGN(accent,L,PrWd,L)_{-zu}, which directs [-zu]’s accent to root-initial positions, we obtain an initially accented output (see tableau [9] for the effect of ALIGN(accent,L,PrWd,L)_{-zu}).

Unlike root-final accents, non-root-final accents will not fall in the rightmost foot in [-zu]-forms; e.g. [noo(tén)(kii)-zu]. Therefore, keeping that accent incurs no violation of NONFIN(Ft), and hence the root accent is preserved, as illustrated in (13). Thus, the constraint NONFIN(Ft) disfavors the preservation of root accents in [-zu]-forms just in case the accent is root-final.

(13) NONFIN(Ft) does not penalize non-root-final accents.

/nooténki- ‘ zu/	NONFIN(Ft)	MAX(root accent)	MAX(zu accent)
→ [noo(tén)(kii)-zu]			’
~ a. [(nóo)(tén)(kii)-zu]		W ₁	L

Before concluding the discussion of final-accented roots, we need to address the fact that Speakers 8-12 sometimes preserve root accents for final-accented roots. To account for the variation, we can assume that for these speakers, the pairwise ranking of MAX(root accent) and NONFIN(Ft) varies from one utterance to another and among items (see e.g. Anttila 2002; Anttila

and Cho 1998; Boersma and Hayes 2001 for different ways of implementing variation), as shown in (14) and (15).

(14) The root accented deleted to satisfy NONFIN(Ft).

/gomí- ' zu/	NONFIN(Ft)	MAX(root accent)	MAX(zu accent)
→ [(gó)(mii)-zu]		'	
~ a. [(go)(míi)-zu]	W _i	L	W _i

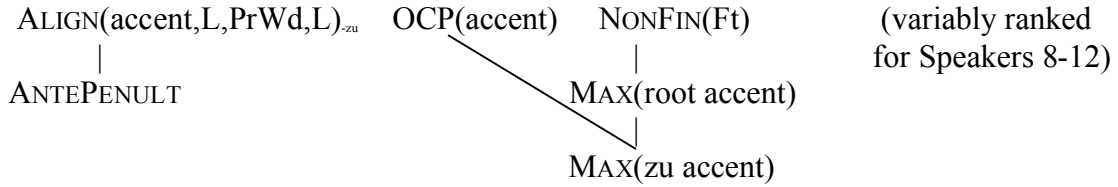
(15) The root accented is protected by MAX(root accent).

/gomí- ' zu/	MAX(root accent)	NONFIN(Ft)	MAX(zu accent)
→ [(go)(míi)-zu]		'	'
~ a. [(gó)(mii)-zu]	W _i	L	L

When NONFIN(Ft) » MAX(root accent) holds, initial accenting results. When MAX(root accent) is instead ranked above NONFIN(Ft), root accents are preserved.

To summarize our analysis, in the case of unaccented roots, [-zu]'s accent docks onto a root-initial syllable due to a left-edge alignment constraint. When roots have a non-final accent, since the ranking MAX(root accent) » MAX(zu accent) holds, speakers preserve root accents. Finally, when roots have a final accent, NONFIN(Ft) forces deletion of the root accent, and therefore [-zu]'s accent surfaces instead, resulting in initial accents. Speakers 8-12 sometimes preserve root accents because NONFIN(Ft) and MAX(root accent) are variably ranked. In (16) we summarize the rankings we have established.

(16) Ranking summary



3.5. Residual issues with the proposed analysis

In this subsection we briefly address two issues which arise from the analysis of [-zu] laid out in Section 3.1-3.4.

3.5.1. *The origin of ALIGN(accent,L,PrWd,L)_{-zu}*. The first issue concerns where the constraint ALIGN(accent,L,PrWd,L)_{-zu} came from. This issue is a matter of some concern, since English (the etymological source of [-zu]) does not have default initial stress, and initial position is not the default location of prominence in Japanese either. However, a similar left-edge alignment constraint has long been active in Japanese phonology in compound accent patterns where the initial syllable of the second member of the compound receives an accent; e.g. /ʃin-jokohama/ → [ʃin-jókohama] ‘Shin-Yokohama (place name)’ and /minami-amerika/ → [minami-ámerika] ‘South America’ (Itô and Mester 2007; Kubozono 1995, 2008; Kubozono, Itô and Mester 1997). It may be that [-zu] took on the compound-like accentual pattern because [-zu] was first extensively used in forming baseball team names (see (3)), which usually have the structure [X-[-zu]]. Because of this compound structure, [Y-zu] received an initial accent, e.g. [seibu-ráion-zu], ‘Seibu Lions’. The suffix [-zu] started being used without the initial element X of the compound structure [X-[-zu]] but it retained its existing association with initial accentuation.

3.5.2. *On the ranking NONFIN(Ft) » MAX(root accent)*. The second issue is the role of NONFIN(Ft) in the analysis of roots with final accents. In our analysis NONFIN(Ft) dominates

MAX(root accent) (the ranking is variable for Speakers 8-12). This ranking by itself would produce an incorrect prediction. Japanese words can have accents on the final syllable, as in [gomí] ‘trash’, but if NONFIN(Ft) is ranked above MAX(root accent), then words like [gomí] would show deletion of their accent, as in (17).¹⁰

(17) NONFIN(Ft) » MAX(root accent) wrongly predicts deletion of root accents.

/gomí/	NONFIN(Ft)	MAX(root accent)
• ^{acc} (gomí)		’
~ a. (gomí)	W ₁	L

However, deletion as in (17) does not occur in Japanese. We can forestall this problem by assuming that NONFIN(Ft) is dominated by a constraint HAVEACCENT, as in (18).

(18) HAVEACCENT: Every Prosodic Word must contain at least one accent (=assign a violation mark for each unaccented word) (Smith 2000, 2002; see also Alderete 1999b, 2001a)

Even when NONFIN(Ft) dominates MAX(root accent), HAVEACCENT protects the root accent, as in (19).

(19) HAVEACCENT blocks deletion.

/gomí/	HAVEACCENT	NONFIN(Ft)	MAX(root accent)
→ (gomí)		’	
~ a. (gomí)	W ₁	L	W ₁

Because Japanese also has unaccented words, HAVEACCENT cannot be top-ranked. We can allow unaccented words by ranking HAVEACCENT below DEP(accent), which forbids epenthesis of accents (Alderete 1999b, 2001a), as in (20a). Another possibility that must be ruled out would be for underlying final accents to shift leftwards, allowing both HAVEACCENT and NONFIN(Ft) to be satisfied; to forestall this, NOFLOP (Alderete 1999b, 2001a), which bars changing an accent's syllabic affiliation between input and output, must dominate NONFIN(Ft), as in (20b).

(20) a. No epenthesis.

/usagi/	DEP(acc)	HAVEACC
→ u(sagi)		'
~ a. u(sá.gi)	W _i	L

b. No flopping.

/d̄ʒoodán/	NOFLOP	HAVEACC	NONFIN(Ft)
→ d̄ʒoo(dán)			'
~ a. (d̄ʒoo)daN	W _i		L

4. Discussion

4.1. Summary

Japanese has developed a root-initial-accenting suffix. We analyzed the accentual behavior of [-zu] using theoretical assumptions which have been previously proposed for independent reasons (floating autosegments, morpheme-specific alignment constraints, between-utterance ranking variation). Our analysis demonstrates by example that conventional views on accent-placement allow for the possibility of a root-initial-accenting suffix like [-zu]. In particular, an autosegmental theory of pre-accentuation predicts the possibility of an initial-accenting suffix: the accent of a suffix is part of the suffix's lexical representation and can be driven to coincide with certain morphological/prosodic edges because of an Alignment constraint.¹¹

4.2. Root-initial pre-accentuation in other theories of process morphology

Even if one does not embrace an autosegmental theory of affix-controlled accent, other prominent theories of morpheme realization also predict that a root-initial accenting suffix is possible. Here we briefly discuss two such major theories: the theory of Transderivational Anti-Faithfulness (TAF), and the RealizeMorpheme (RM) theory.

TAF theory (Alderete 1999b, 2001a) posits anti-faithfulness constraints on the output-output dimension of correspondence. Each of these constraints demands that a derived word be dissimilar from its base in some specified way. This theory predicts that an initial-accenting suffix like [-zu] is possible because a suffix can be indexed to an anti-faithfulness constraint that is a negation of a positional faithfulness constraint to the initial syllable (Alderete 1999b: 140). If a suffix is indexed to ANTI-DEP(accent)_{initial-Syll-}, accentual effects like those of [-zu] will be obtained.

In RM theory, a morpheme is required to receive some phonological exponence by a REALIZEMORPHEME constraint (Kurusu 2001). Like TAF constraints, RM demands that affixed words be dissimilar from their bases; the difference from TAF theory is that RM does not specify what sort of dissimilarity there should be. So far as RM is concerned, any difference will do. The ranking of the rest of the language's constraints is responsible for determining what change is made.

This theory needs to allow distinct cophonologies for words formed with different affixes (or, equivalently, indexed constraints which apply to whole words belonging to a given morphological category) because a single language can have multiple affixes which are associated with different patterns of nonconcatenative alterations to their bases (Kurusu 2001: 94). On this view, a suffix could well be associated with a cophonology whose ranking required default word-initial accentuation (a ranking which we know must be possible, since there exist languages with default initial prominence, e.g. Cupeño: Hill and Hill 1968: 234; Czech: Janda

and Townsend 2000). The result would be an initial-accenting suffix. In sum, then, the three theories of morpheme realization which possess the greatest degree of mainstream currency in OT — floating-autosegment approaches, TAF theory, and RM theory — all predict the possibility of non-local preaccentuation, and the existence of [-zu] confirms these predictions.

4.3. *Other predicted and attested types of opposite-edge process morphology*

The confirmation provided by [-zu] is particularly welcome because the evidence for root-initial-accenting suffixes or root-final-accenting prefixes is otherwise scant. Besides [-zu], we know of only one possible example of each. Cupeño has two suffixes which place a stress on the first vowel of the root: [-wə] (present imperfect with plural subject) and [-wənə] (past imperfect with plural subject) (Hill and Hill 1968). However, it is not clear that the root-initial-accenting status of Cupeño [-wə] and [-wənə] is an idiosyncratic property of those suffixes, since the default location of stress in Cupeño is reportedly initial (Hill and Hill 1968: 234). Japanese, but not Cupeño, therefore provides a clear case for initial accenting triggered by a suffix, rather than by a general default accent assignment principle.

The only possible example of a final-accenting prefix that we are aware of comes from Luganda. Negation in this language is often marked by a segmental prefix and by a tonal suffix, leading Peterson (1993) to entertain the possibility that Luganda has prefix + tone circumfixes (i.e., final-accenting prefixes). However, he argues against this analysis for two reasons. First, the tonology of the language suggests that tonal suffixation occurs prior to prefixation in morphological derivations, implying that the tones and the prefixes are not single morphemes. Second, treating the prefix and the tone as a single morpheme does not actually make it possible to eliminate redundant reference to inflectional features (which would be the point of analyzing the two exponents of negation as a single circumfixal morpheme). Given these possible objections, Luganda may not provide as clear an argument for the existence of opposite-edge pre/post-accentuation as Japanese does. The Luganda example does, however, foreground the issue of whether final-accenting prefixes do exist. Our analysis of [-zu] leads us to expect that there

should be, and as such, examples should be sought.

Because Alignment constraints can govern the edge-orientation of any phonological object, not just accents, tones, or stresses, our approach to the [-zu] data also leads us to expect that there should be similar patterns involving other types of process morphology. For example, one can imagine suffixes whose UR, like that of [-zu], includes a floating mora, and that this mora docks on the vowel of the root-initial syllable in order to satisfy an ALIGN-L constraint. The result would be a suffix which triggers lengthening of the first vowel of the base, in contrast to locally pre-lengthening suffixes like [-zu], which cause lengthening of the last vowel of the base. An anonymous reviewer has brought to our attention that initial-lengthening suffixes do indeed exist in several Nootkan languages (see Flynn 2002 and references cited therein). The presence of such suffixes lends credence to the idea that [-zu]'s initial-accenting behavior is not an isolated case or the result of some narrow idiosyncrasy of Japanese accent, but instead a reflection of more general possibilities made available by UG.

Just as we predict that both initial-accenting suffixes and final-accenting prefixes should be found in natural languages, we also expect that there should be final-lengthening prefixes in addition to initial-lengthening suffixes. Presently, we are not aware of any examples of final-lengthening prefixes. One last possibility is that an affix might introduce floating segmental features like [+voice] or [+nasal], which dock at the opposite edge from the affix itself. We do not know of any convincing examples of this, either; indeed, with affixes that trigger mutation of segmental features, in nearly all known cases the change will only occur at the edge immediately adjacent to the affix (McCarthy 2003). If this is a systematic rather than an accidental gap, it may reflect some fundamental difference between segmental features on the one hand and prosodic objects like accents or moras on the other. Perhaps Alignment constraints cannot refer to both a Prosodic Word edge and a segmental feature, in keeping with a more general proposal by de Lacy (2002: 49-50) about what kinds of phonological objects may be mentioned by a single constraint. In any case, our data on [-zu] confirm that opposite-edge process morphology is possible for pre-accenting suffixes, a finding which invites continuing investigation into the

possible existence of comparable effects with prefixes, and with phonological objects other than accent.

4.4. *Further questions relating to the phonology-morphology interface*

Another set of questions that can be asked in connection with opposite-edge process morphology concerns the morphological scope of the phenomenon. Suppose that in some language we have an initial-pre-accenting suffix like [-zu], and that this suffix occurs in a word with the morphological bracketing [*prefix* [[*root*] *suffix*]]. Is it possible for the accent introduced by *suffix* to dock on the initial syllable of *prefix* (and therefore on the first syllable of the overall word) even though *prefix* is external to *suffix* in the morphological bracketing? In fully-parallel classic OT, with all the morphemes of the word present in the original input, there seems to be no bar to this possibility. On the other hand, if we adopt a framework like Stratal OT (Kiparsky 2000), where there are several successive optimizations for successively larger morphological levels, the possibilities are more restricted. If, say, *suffix* is a Level 1 affix and *prefix* is a Level 2 affix, then it may be that the location of *suffix*'s accent will be decided in the Level 1 optimization, before *prefix* is added. If *suffix* and *prefix* belonged to the same lexical level, then it might be possible for *suffix*'s accent to dock onto *prefix*, so long as the level in question is non-cyclic (meaning that *prefix* and *suffix* would be added simultaneously, in the input to the same optimization). Japanese unfortunately does not provide a good test case for these matters because there are no prefixes that can attach to [-zu]-words in a semantically coherent way.

The morphological distribution of pre-/post-accentuation is also relevant to the predictions of TAF theory.¹² Because TAF constraints, by hypothesis, only evaluate on the Output-Output dimension of correspondence, they can only induce changes in material that a given affixed word shares with the other word(s) with which it stands in OO-correspondence. This is because the TAF constraints can inspect only this corresponding material to check for non-identity. Probably the most familiar assumption regarding which words stand in correspondence with which others

is that of base identity (Benua 1997): the base of OO-correspondence of a given word formed with a derivational affix is the same word, minus that affix. So, in our hypothetical example, [*prefix* [[*root*] *suffix*]] has as its base [[*root*] *suffix*], which in turn has as its base [*root*]. If pre-accentuation (initial or final) occurs to satisfy TAF constraints, it would follow that *suffix* can introduce an accent onto *root*, but not onto *prefix*. This restrictive prediction — an instance of what Alderete (1999b: 141) dubs ‘Strict Base Mutation’ — will not, however, necessarily hold up under different theories about which words stand in OO-correspondence. Alternatives to base identity are suggested most often in connection with words related by inflectional rather than derivational morphology. For example, McCarthy (2005) proposes that in inflectional paradigms, every word stands in OO-correspondence with every other. If our hypothetical prefix and suffix are inflectional, then [*prefix* [[*root*] *suffix*]] would, on this proposal, stand in correspondence with [*prefix* [*root*]] as well as with [[*root*] *suffix*]. The accent introduced by *suffix* in [*prefix* [[*root*] *suffix*]] then could land on *prefix*, in order to keep [*prefix* [[*root*] *suffix*]] accentually non-identical to [*prefix* [*root*]] (Frazier 2006). As such, if TAD is assumed, the attested morphological distribution of pre-/post-accentuation will help determine what theory of paradigmatic organization should be adopted.

We cannot hope to settle here the much-debated question of which of these frameworks — Stratal OT, base identity, paradigm uniformity, or something else — is the most appropriate model of phonological relations between morphologically-related words. However, it is worth raising the issue of *morphological* locality in pre-accentuation (and other kinds of process morphology) since, to some extent, this issue is only able to come up if pre-accentuation is capable of being *phonologically* non-local. If it really were the case that a pre-accenting suffix could only ever introduce an accent onto the adjacent, final syllable of the base, then this phonological universal would independently exclude the scenario where *suffix*’s accent docks onto *prefix* in the structure [*prefix* [[*root*] *suffix*]], regardless of what theory of OO-correspondence or stratal organization were assumed. But the [-zu] data show that the accent introduced by a pre-accenting suffix *can* dock somewhere other than adjacent to the suffix itself. Therefore, if pre-accentuation of *prefix* by *suffix* in the structure [*prefix* [[*root*] *suffix*]] is unattested, the explanation for this will have to be sought in the system of cycles, strata, or OO-

correspondence, rather than in any narrowly phonological principle of accentual locality. Thus, as more examples of opposite-edge process morphology are found and investigated (as we hope and expect will be the case), they may prove to illuminate facts about the nature of phonological relations between morphologically-related words that might have remained hidden were affix-governed accentuation always phonologically local.

5. Conclusion

To conclude, the [-zu] data presented in this paper show that a suffix can pre-accent onto the initial syllable of its base. As standard theories of pre-/post-accentuation predict the possibility of root-initial accenting suffixes, the existence of [-zu] is theoretically reassuring.

¹ Some old forms do not show this lengthening (e.g. [hoéeru-zu] (name of a baseball team) and [tónneru-zu] (name of a comedy group)). Old forms can also be pronounced with [su] rather than with [zu] (e.g. [ésuparu-su] (name of a soccer team) (Itô and Mester 2006; Tateishi 2003)).

² Japanese coda nasals assimilate in place to the following consonant and are realized as [N] word-finally. We set this alternation aside in the following analysis.

³ Out of 31 test items, the four speakers each showed initial accents for 0, 1, 3, and 5 items, respectively, and mostly resorted to default accent placement.

⁴ We assume, following Kubozono (1999: 50-54), that Japanese syllabifies VVN sequences as [V.VN]. Therefore, the accent of a word like [harikéen] is not on the final syllable.

⁵ This is not the only alignment-based analysis possible. We could also invoke a constraint $\text{Align}([-zu], L, \text{PrWd}, L)$, which requires some exponent of the morpheme [-zu] to appear at the left edge of the word.

⁶ The sporadic appearance of antepenultimate mora accent in unaccented and non-final accented roots may be due to either a (sporadic) reranking of ANTEPENULT over $\text{ALIGN}(\text{accent}, L, \text{PrWd}, L)$ or to speakers treating the stimuli as morphologically simplex. Those speakers who consistently showed antepenultimate patterns may consistently rank ANTEPENULT over $\text{ALIGN}(\text{accent}, L, \text{PrWd}, L)$.

⁷ In other languages, indexed markedness constraints are required in order to analyze exceptional triggering of processes: a closed class of morphemes in some language trigger an alternation in other morphemes, but most morphemes of the relevant phonological shape do not trigger the alternation. (On this point, see in particular the discussion of Yine syncope in Pater to appear).

⁸ On faithfulness constraints to root structures, see Alderete (2001b), Beckman (1998) and McCarthy and Prince (1995). The ranking $\text{MAX}(\text{root accent}) \gg \text{MAX}(\text{zu accent})$ indicates that [-zu] behaves as a recessive affix. Therefore, we may be able to replace $\text{MAX}(\text{zu accent})$ with a more general $\text{Max}(\text{recessive accent})$. However, the constraint cannot be as general as $\text{Max}(\text{affix accent})$ because there are some dominant affixes (like [-ke]) which can replace root accents.

⁹ An alternative analysis, which was suggested to us independently by Paul de Lacy, John McCarthy and Kathryn Flack Potts is to say that accents cannot stay on the root-final syllable because the root-final syllable contains a floating mora from [-zu]. This analysis requires a constraint that prohibits an accent on a syllable containing an affixal mora (perhaps an OO-faithfulness analogue of the constraint HEADDEP (Alderete 1999a), which forbids stressing epenthetic segments). We do not take this view because lengthening does not occur if the root-final syllables are already heavy, so there is no guarantee that final heavy syllables contain an affixal mora.

¹⁰ An anonymous reviewer points out that Japanese nevertheless shows a tendency to lose word-final accents. Deverbal nouns are accentless if the underlying verb is accentless, but final-

accented if the underlying verb is accented. However, there are quite a few cases in which deverbal nouns based on accented verbs, which we would expect to be finally-accented, are unaccented (Kawakami 1973; Poser 1992: 115).

¹¹ The same prediction is made by models of pre-/post-accentuation in which foot brackets are reified as representational objects, with ‘floating’ foot brackets posited in the underlying forms of pre-/post-accenting morphemes (Idsardi 1992). If implemented in OT (see Apoussidou 2003 for an example), these brackets would be just as potentially subject to morpheme-specific Alignment constraints as accents are.

¹² Thanks to an anonymous reviewer for raising this issue.

References

- Akinlabi, Akinbiyi. 1996. Featural affixation. *Journal of Linguistics* 32. 239-289.
- Alderete, John. 1999a. Faithfulness to prosodic heads. In B. Hermans & M. van Oostendorp (eds.), *The Derivational Residue in Phonological Optimality Theory*, 29-50. Amsterdam: John Benjamins.
- Alderete, John. 1999b. *Morphologically-Governed Accent in Optimality Theory*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Alderete, John. 2001a. Dominance effects as transderivational anti-faithfulness. *Phonology* 18. 201-253.
- Alderete, John. 2001b. Root-controlled accent in Cupeno. *Natural Language and Linguistic Theory* 19. 455-502.
- Andersen, Torben. 1995. Morphological stratification in Dinka: On the alternations of voice quality, vowel length, and tone in the morphology of transitive verb roots in a monosyllabic language. *Studies in African Linguistics* 23. 1-63.

-
- Anttila, Arto. 2002. Morphologically conditioned phonological alternations. *Natural Language and Linguistic Theory* 20. 1-42.
- Anttila, Arto & Young-mee Yu Cho. 1998. Variation and change in Optimality Theory. *Lingua* 104. 31-56.
- Apoussidou, Diana. 2003. The deformity of anti-faithfulness. In J. Spenader, A. Eriksson & Ö. Dahl (eds), *Proceedings of the Stockholm Workshop on Variation Within Optimality Theory*, 15-24. Stockholm: Department of Linguistics, University of Stockholm.
- Beckman, Jill. 1998. *Positional Faithfulness*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Benua, Laura. 1997. *Transderivational Identity: Phonological Relations between Words*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Berko, Jean. 1958. The child's learning of English morphology. *Word* 14. 150-177.
- Boersma, Paul & Bruce Hayes. 2001. Empirical tests of gradual learning algorithm. *Linguistic Inquiry* 32. 45-86.
- de Lacy, Paul. 2002. *The Formal Expression of Markedness*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Flack, Kathryn. 2007. Templatic morphology and indexed markedness constraints. *Linguistic Inquiry* 38. 749-758.
- Flynn, Darin. 2002. Alignment in Nootkan Prosodic Morphology. Paper presented at the University of Alberta Department of Linguistics Colloquium Series, Edmonton, AB, 15 February.
- Frazier, Melissa. 2006. Accent in Proto-Indo-European Athematic Nouns: Antifaithfulness in

-
- Inflectional Paradigms. Chapel Hill, NC: University of North Carolina MA thesis.
- Fukazawa, Haruka. 1999. *Theoretical Implications of OCP Effects on Features in Optimality Theory*. College Park, MD: University of Maryland, College Park dissertation.
- Gnanadesikan, Amalia. 1997. *Phonology with Ternary Scales*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Goldsmith, John. 1976. *Autosegmental Phonology*. Cambridge, MA: MIT dissertation.
- Gordon, Matthew. 2003. The phonology of pitch accents in Chickasaw. *Phonology* 20. 173-218.
- Gouskova, Maria. 2007. The reduplicative template in Tonkawa. *Phonology* 24. 367-396.
- Haraguchi, Shosuke. 1977. *The tone pattern of Japanese: An autosegmental theory of tonology*. Tokyo: Kaitakusha.
- Haraguchi, Shosuke. 1991. *A Theory of Stress and Accent*. Dordrecht: Foris.
- Hill, Jane, & Kenneth Hill. 1968. Stress in Cupan (Uto-Aztecan) languages. *International Journal of American Linguistics* 34. 233-241.
- Idsardi, William. 1992. *The Computation of Prosody*. Cambridge, MA: MIT dissertation.
- Itô, Junko, Yoshihisa Kitagawa, & Armin Mester. 1996. Prosodic faithfulness and correspondence: Evidence from a Japanese Argot. *Journal of East Asian Linguistics* 5. 217-294.
- Itô, Junko & Armin Mester. 1992. Weak layering and word binarity. Ms. University of California, Santa Cruz.
- Itô, Junko, & Armin Mester. 1999. The phonological lexicon. In N. Tsujimura (ed.), *The Handbook of Japanese Linguistics*, 62-100. Oxford: Blackwell.

-
- Itô, Junko, & Armin Mester. 2001. Covert generalizations in Optimality Theory: The role of stratal faithfulness constraints. *Studies in Phonetics, Phonology, and Morphology* 7. 273-299.
- Itô, Junko, & Armin Mester. 2003. *Japanese Morphophonemics: Markedness and Word Structure*. Cambridge: MIT Press.
- Itô, Junko, & Armin Mester. 2006. Indulgentia Parentum Filiōrum Perniciēs: Lexical allomorphy in Latin and Japanese. In E. Bakovic, J. Itô & J. McCarthy (eds.), *Wondering at the Natural Fecundity of Things: Essays in Honor of Alan Prince*, 201-211. Santa Cruz: Linguistics Research Center, University of California, Santa Cruz.
- Itô, Junko, & Armin Mester. 2007. Prosodic adjunction in Japanese compounds. *The Proceedings of Formal Approaches to Japanese Linguistics* 4. 97-112.
- Janda, Laura, & Charles E. Townsend. 2000. *Czech*. Munich: Loncom Europa.
- Katayama, Motoko. 1998. *Optimality Theory and Japanese Loanword Phonology*. Santa Cruz, CA: University of California, Santa Cruz dissertation.
- Kawakami, Shin. 1973. *Doosi kara no tensei meisi no akusento* [Accentuation of deverbal nouns]. In Imaizumi Hakase Koki Kinen Kokugogaku Ronsoo, pp. 55-70.
- Kiparsky, Paul. 2000. Opacity and Cyclicity. *The Linguistic Review* 17. 351-367.
- Kraska-Szlenk, Iwona. 1997. Exceptions in phonological theory. In *Proceedings of the 16th International Conference of Linguists*, paper no. 0173. Oxford: Pergamon.
- Kraska-Szlenk, Iwona. 1999. Syllable structure constraints in exceptions. In J. Rennison & K. Kühnhammer (eds.), *Phonologica 1996: Syllables!?*, 113-131. The Hague: Thesus.

-
- Kubozono, Haruo. 1995. Constraint interaction in Japanese phonology: Evidence from compound accent. In R. Walker, O. Lorentz & H. Kubozono (eds.), *Phonology at Santa Cruz [PASC] 4*, 21-38. Santa Cruz: Linguistics Research Center, UC Santa Cruz.
- Kubozono, Haruo. 1997. Lexical markedness and variation: A nonderivational account of Japanese compound accent. In Brian Agbayani & Sze-Wing Tang (eds.), *West Coast Conference on Formal Linguistics 15*.
- Kubozono, Haruo. 1999. Mora and syllable. In N. Tsujimura (ed.), *The Handbook of Japanese Linguistics*, 31-61. Oxford: Blackwell.
- Kubozono, Haruo. 2006a. Weight neutralization in Japanese. *Journal of Japanese Linguistics* 20.
- Kubozono, Haruo. 2006b. Where does loanword prosody come from?: A case study of Japanese loanword accent. *Lingua* 116. 1140-1170.
- Kubozono, Haruo. 2008. Japanese accent. In S. Miyagawa & M. Saito (eds.), *The Handbook of Japanese Linguistics*. Oxford: Oxford University Press.
- Kurusu, Kazutaka. 2001. *The Phonology of Morpheme Realization*. Santa Cruz, CA: University of California, Santa Cruz dissertation.
- Kurusu, Kazutaka. 2005. Gradient prosody in Japanese. *Journal of East Asian Linguistics* 14. 175-226.
- Lieber, Rochelle. 1983. New developments in Autosegmental Morphology: Consonant mutation. In M. Barlow, D. Flickinger & M. T. Wescoat (eds.), *Proceedings of the Second West Coast Conference on Formal Linguistics*, 165-175. Stanford: University Linguistics Association.
- Lieber, Rochelle. 1987. *An Integrated Theory of Autosegmental Processes*. Albany: SUNY Press.

-
- McCarthy, John J. 1983a. Consonantal morphology in the Chaha verb. In M. Barlow, D. Flickinger & M. Westcoat (eds.), *Proceedings of the Second West Coast Conference on Formal Linguistics 2*, 176-188. Stanford: Stanford Linguistic Association.
- McCarthy, John J. 1983b. Phonological features and morphological structure. In J. Richardson, M. Marks & A. Chukerman (eds.), *Proceedings from the Parasession on the Interplay of Phonology, Morphology and Syntax*, 331-399. Chicago: CLS.
- McCarthy, John J. 2003. OT constraints are categorical. *Phonology* 20. 75-138.
- McCarthy, John J. 2005. Optimal paradigms. In Laura Downing, T.A. Hall, and Renate Raffelsiefen (eds.), *Paradigms in phonological theory*, 295–371. Oxford: Oxford University Press.
- McCarthy, John K. 2008. *Doing Optimality Theory*. Malden and Oxford: Blackwell.
- McCarthy, John J. & Alan Prince. 1986. Prosodic morphology. Ms. University of Massachusetts, Amherst and Rutgers University.
- McCarthy, John & Alan Prince. 1993. Generalized alignment. In G. Booij & J. van Marle (eds.), *Yearbook of Morphology*, 79-153. Dordrecht: Kluwer.
- McCarthy, John & Alan Prince. 1995. Faithfulness and reduplicative identity. In J. Beckman, L. Walsh Dickey & S. Urbanczyk (eds.), *University of Massachusetts Occasional Papers in Linguistics 18*, 249-384. Amherst: GLSA.
- McCawley, James. 1968. *The Phonological Component of a Grammar of Japanese*. The Hague: Mouton.
- Ota, Mitsuhiro. 2004. The learnability of the stratified phonological lexicon. *Journal of Japanese Linguistics* 20. 19-40.

-
- Pater, Joe. 2000. Nonuniformity in English secondary stress: The role of ranked and lexically specific constraints. *Phonology* 17. 237-274.
- Pater, Joe. To appear. Morpheme-specific phonology: Constraint indexation and inconsistency resolution. In S. Parker (ed.), *Phonological Argumentation: Essays on Evidence and Motivation*. London: Equinox.
- Peterson, David. 1993. Multiple exponence and morphosyntactic redundancy. In E. Duncan, D. Farkas & P. Spaelti (eds.), *Proceedings of the Twelfth West Coast Conference on Formal Linguistics*, 83—100. Stanford: CSLI/Stanford Linguistics Association.
- Pierrehumbert, Janet & Mary Beckman. 1988. *Japanese tone structure*. Cambridge, Mass.: MIT Press.
- Poser, William. 1984. *The Phonetics and Phonology of Tone and Intonation in Japanese*. Cambridge, MA: MIT dissertation.
- Poser, William. 1990. Evidence for foot structure in Japanese. *Language* 66. 78-105.
- Poser, William J. 1992. Blocking of phrasal constructions by lexical items. In I.A. Sag & A. Szabolsci (eds.), *Lexical Matters*, 111-130. Stanford: CSLI Publications.
- Prince, Alan & Paul Smolensky. 1993 [2004]. *Optimality Theory: Constraint Interaction in Generative Grammar*. Malden and Oxford: Blackwell.
- Prince, Alan. 2002. Arguing optimality. In A. Carpenter, A. Coetzee & P. de Lacy (eds.), *University of Massachusetts Occasional Papers in Linguistics 26: Papers in Optimality Theory II*, 269—304. Amherst: GLSA.
- Pulleyblank, Douglas. 1984. Autosegmental accent. In C. Jones & P. Sells (eds.), *Proceedings of NELS 14*, 343—359. Amherst: GLSA

-
- Revithiadou, Anthi. 2008. Colored turbid accents and containment: A case study from lexical stress. In S. Blaho, P. Bye & M. Kraemer (eds.), *Freedom of Analysis?*. Berlin: Mouton de Gruyter.
- Selkirk, Elisabeth. 1995. The prosodic structure of function words. In J. Beckman, L. Walsh Dickey & S. Urbanczyk (eds.), *Papers in Optimality Theory*, 439—470. Amherst: GLSA.
- Shinohara, Shigeko. 2000. Default accentuation and foot structure in Japanese: Evidence from Japanese adaptations of French words. *Journal of East Asian Linguistics* 9. 55-96.
- Smith, Jennifer. 2000. Noun faithfulness and accent in Fukuoka Japanese. In S. Bird, A. Carnie, J. Haugen & P. Norquest (eds.), *The Proceedings of the West Coast Conference on Formal Linguistics 18*, 519-531. Somerville: Cascadilla Press.
- Smith, Jennifer. 2002. *Phonological Augmentation in Prominent Positions*. Amherst, MA: University of Massachusetts, Amherst dissertation.
- Sprague, Colin. 2005. A constraint based account of floating morae. Paper presented at 79th LSA Annual Meeting, Oakland, CA.
- Suzuki, Hisami. 1995. Minimal words in Japanese. In A. Dainora, R. Hemphill, B. Luka, B. Need & S. Pargman (eds.), *Papers from the 31st Regional Meeting of the Chicago Linguistic Society: Volume 1.*, 448-463. Chicago: CLS.
- Tateishi, Koichi. 1991. Les implications theoriques du langage des musiciens japonais. In M. Plenat (ed.), *Les javanais*, 51-72. Paris: Larousse.
- Tateishi, Koichi. 2003. Phonological patterns and lexical strata. In *The Proceedings of International Congress of Linguistics XVII (CD-ROM)*. Prague: Matfyz Press.
- Wolf, Matthew. 2007. For an autosegmental theory of mutation. In L. Bateman, M. O'Keefe, E. Reilly & A. Werle (eds.), *University of Massachusetts Occasional Papers in Linguistics 32: Papers in Optimality Theory 3*, 315-404. Amherst: GLSA.

Zoll, Cheryl. 1996. *Parsing below the Segment in a Constraint—based Framework*. Berkeley, CA: University of California, Berkeley dissertation.

Zoll, Cheryl. 2003. Optimal tone mapping. *Linguistic Inquiry* 34. 225-268.