

HIAKI (YAQUI) REDUPLICATION REDUX: MORPHOLOGICAL *AND* PROSODIC
TARGETS IN SYLLABIC REDUPLICATION

JASON D. HAUGEN

OBERLIN COLLEGE

Abstract: Different analyses have been applied to the distinction between CV and CVC syllabic reduplication in Hiaki (Yaqui), which has a complex system of reduplicative allomorphy. Haugen 2003 proposes that CVC reduplication is dependent upon the SYLLABLE structure of the verb (an onset consonant of the second syllable of a verb stem cannot serve as a coda in a reduplicant), but Harley & Leyva 2009 regard CVC reduplication as copying CVC ROOTS. This paper demonstrates that neither approach is fully adequate to account for all cases of syllabic reduplication in Hiaki. Rather, Hiaki grammar references BOTH roots (morphological constituents) AND syllable structure (prosodic constituents) for different classes of reduplication. Prosodic base-dependence at the level of the syllable is typologically rare but not otherwise unattested in syllabic reduplication.

[KEYWORDS: Hiaki (Yaqui); reduplication; prosodic targets for reduplication; syllable copy reduplication]

1. Introduction: reduplicative allomorphy in Hiaki. Various studies over the past quarter century have been devoted to empirical and theoretical issues pertaining to reduplication in Hiaki (Yaqui, also known as Yoeme; ISO 639-3 yaq), a Uto-Aztecan language of Sonora, Mexico and Arizona, USA (see, e.g., Escalante 1985, Martínez Fabián 1994, Demers, Escalante and Jelinek 1999, Haugen 2003, Harley and Amarillas 2003, and Harley and Leyva 2009, among others). Hiaki reduplication is especially interesting because it exhibits rampant allomorphy wherein different reduplication forms (henceforth, REDUPPLICANTS) can serve multiple semantic functions, and each semantic function can also be marked by each reduplication form. In the most recent contribution to this growing literature on Hiaki reduplication Harley and Leyva (2009), henceforth “H&L”, usefully give a descriptive summation of the different reduplicants, as follows:¹

(1) Hiaki Reduplicative Allomorphs (Harley and Leyva 2009: 238)

(1a)	RED _S	<i>hi.nu</i>	‘buy’	→	<i>hi-hi.nu</i>	‘buy (habitually)’
(1b)	RED _{CL}	<i>čam.ta</i>	‘mash’	→	<i>čam-čam.ta</i>	‘be mashing s.th.’
(1c)	RED _{SS}	<i>či.toh.te</i>	‘slip’	→	<i>či.to-či.toh.te</i>	‘slip (habitually)’
(1d)	RED _G	<i>ka.pon.te</i>	‘castrate’	→	<i>kap.pon.te</i>	‘castrate (habitually)’
(1e)	RED _{S+G}	<i>kii.mu</i>	‘enter’	→	<i>kik-ki.mu</i>	‘really enter’

(emphatic)

The relevant reduplication patterns are: a single open syllable (1a), labeled as “RED_S”, with the subscript *S* referring to ‘(open) syllable reduplicant’; a single closed syllable (1b), labeled “RED_{CL}” for ‘closed syllable reduplicant’; two open syllables (1c), labeled “RED_{SS}” for ‘two (open) syllables’; word-internal gemination (1d), labeled “RED_G” for ‘gemination’; and finally, single syllable reduplication concurrent with word-internal gemination (1e), labeled RED_{S+G} for

‘(open) syllable reduplication \pm gemination’. Three of these reduplicants are syllabic (1*a*, 1*b*, 1*e*), with the RED_{S+G} type (1*e*) being distinguishable from the other two in that it alone induces gemination between the reduplicant and the stem to which reduplication applies. I will claim below that this is a result of the RED_{S+G} class forming a heavy syllable (i.e. one composed of two moras), which contrasts it with the RED_S (CV) and RED_{CL} (CVC) syllabic reduplication classes in (1*a*) and (1*b*), which I will claim involve only one mora.

Each of these different reduplication patterns can be used for a variety of different semantic functions, including the marking of habitual aspect (e.g. 1*a*, 1*c*, 1*d*), progressive aspect (e.g. 1*b*), or for emphasis (e.g. 1*e*); the most common function is marking habituality. See H&L for extensive discussion and documentation on this point.

There is a general consensus that some lexical specification is required for the pairing of different reduplicants to specific roots in Hiaki (i.e. the pairing of the reduplication forms in (1) to a particular verb stem is not always entirely predictable from phonological or morphological factors), but there currently exists particular disagreement as to the best characterization of the CV and CVC syllabic reduplication patterns illustrated in (1*a*) and (1*b*), respectively. Clarifying the points of disagreement on this issue and arriving at a compromise solution is the focus of the present paper.

Haugen (2003) holds that the CV/CVC distinction observed in the two different (non-gemination-inducing) syllabic reduplicants (i.e. RED_S vs. RED_{CL} in H&L’s nomenclature) is dependent upon the syllabification of the stem to which reduplication applies. Specifically, reduplication may copy a CVC *iff* the first syllable of the verb stem is itself of the form CVC. This analysis entails that Hiaki syllabic reduplicants are sensitive to the PROSODIC (specifically, SYLLABIC) structure of the stem to which they apply.² H&L, on the other hand, maintain that

CVC reduplicants instead derive from copying CVC ROOTS. Accordingly, H&L decompose words like *čamta* ‘mash’ into a root, e.g. $\sqrt{\text{ČAM}}$ ‘mash’, plus a suffix, *-ta*, which they propose to be a transitivizer (ν°). This second analysis entails that Hiaki CVC reduplicants must be sensitive to the MORPHOLOGICAL structure of the stem to which they apply.

Crucially, Haugen (2003) and H&L (2009) are in agreement that the prosodic structure of the stem is indeed to some extent relevant to Hiaki reduplication, because a second syllable onset of a given stem may never copy into the coda of a reduplicant, whatever the morphological structure of that stem may be. That is, CV- first syllable reduplicants can never reduplicate the onset of the second syllable as a coda in the reduplicant, thus **hin-hi.nu*.³ In the remainder of this paper I would like to advance the proposition that BOTH theoretical approaches—morphologically decompositional AND prosodically-driven—must be utilized in order to account for all cases of reduplication in Hiaki. Neither approach alone is sufficient because important exceptions contradict both approaches at generalization regarding what gets targeted in Hiaki syllabic reduplication. Therefore, Hiaki grammar makes reference to BOTH kinds of information, morphological (roots) as well as prosodic (syllables), in determining what may be copied in reduplication. The upshot of the present discussion is that the analyses provided in Haugen (2003) and H&L (2009) are complementary rather than incompatible.

This paper is structured as follows. Section 2 presents the evidence that suggests that both morphological and prosodic information is needed to account for various cases of Hiaki syllabic reduplication. Section 3 then discusses the significant implications of these findings.

Typologically, sensitivity to the syllable structure of a stem is quite rare in single syllable reduplication, so much so that it has been repeatedly claimed to not exist. Thus, the Hiaki facts are of great importance to our understanding of the possible patterns of reduplication cross-

linguistically (§3.1). Second, the empirical fact that Hiaki reduplication can be sensitive to the prosodic structure of the stem to which it attaches (i.e. its “base”) in syllabic reduplication also raises some interesting issues for different theories of reduplication, which will be briefly reviewed in §3.2. Section 4 concludes.

As one last introductory remark I would like to offer a note about the sources for the Hiaki reduplication data which are referenced in this paper. There are two extant large corpora of reduplication data for Hiaki verbs: (i) the dictionary compiled by Molina, Valenzuela, and Shaul (1999), which contains at least one reduplication form for most of the hundreds of verb entries contained therein; and (ii) the corpus of verbal reduplication forms compiled and described by H&L (2009). Most forms cited in Haugen (2003) come from the Molina et al. dictionary corpus (where the co-authors Felipe Molina and Herminia Valenzuela served as native speaker sources of the reduplication data), whereas H&L report verbal reduplication forms from native speakers Maria Florez Leyva and Rosario Buitimea. While much is in agreement between the two sources about how each individual verb reduplicates, there are some differences between the two. I take this to indicate that there are some dialectal (and possibly even idiolectal) differences between speakers about how particular verbs reduplicate (and, perhaps in some cases, in what specific meaning results when reduplication applies to particular verbs).

Regarding the proper analysis of Hiaki syllabic reduplication, it is crucial to the claims of this paper, though, that NEITHER theoretical approach, prosody-oriented or root-oriented, is able to account for all cases of syllabic reduplication in EITHER of these large corpora of Hiaki reduplication forms. Exceptions to both approaches can be found in both sources. I take this to be strong evidence that a fully adequate analysis of Hiaki syllabic reduplication requires access

to both prosodic (syllable) and morphological (root) structure, and it is to the evidence for and development of such a hybrid analysis that we now turn.

2. The evidence for both morphological and prosodic targets in Hiaki reduplication.

Haugen (2003) presents the following contrasting reduplication forms as evidence that Hiaki reduplication must reference the prosodic structure of its stem (the data originally appeared in Molina et al. 1999). The claim is that verb stems with CV-initial syllables typically reduplicate the first CV (as in 2.1) but verb stems with CVC-initial syllables typically reduplicate the first CVC (as in 2.2). (The semantic contribution of the reduplication in each of these cases is habitual action; I will refer to this contrasting pattern of reduplication as “the Hiaki habitual”):

(2) “Syllable Copy” reduplication in the Hiaki habitual (Haugen 2003: 80 [6,7])

(2.1) CV.CV-initial stems

(2.1a)	<i>vu.sa</i>	<i><u>vu</u>.vu.sa</i>	<i>*<u>vus</u>.vu.sa</i>	‘awaken’
(2.1b)	<i>či.ke</i>	<i><u>či</u>.či.ke</i>	<i>*<u>čik</u>.či.ke</i>	‘comb one’s hair’
(2.1c)	<i>ču.pa</i>	<i><u>ču</u>.ču.pa</i>	<i>*<u>čup</u>.ču.pa</i>	‘grow (t.v.)’
(2.1d)	<i>he.wi.te</i>	<i><u>he</u>.he.wi.te</i>	<i>*<u>hew</u>.he.wi.te</i>	‘agree’
(2.1e)	<i>ko.’a.rek</i>	<i><u>ko</u>.ko.’a.rek</i>	<i>*<u>ko</u>’.ko.’a.rek</i>	‘wear a skirt’

(2.2) CVC.CV-initial stems

(2.2a)	<i>vam.se</i>	<i><u>vam</u>.vam.se</i>	<i>*<u>va</u>.vam.se</i>	‘hurry’
(2.2b)	<i>čep.ta</i>	<i><u>čep</u>.čep.ta</i>	<i>*<u>če</u>.čep.ta</i>	‘jump over’
(2.2c)	<i>čuk.ta</i>	<i><u>čuk</u>.čuk.ta</i>	<i>*<u>ču</u>.čuk.ta</i>	‘cut with a knife or saw’
(2.2d)	<i>hit.ta</i>	<i><u>hit</u>.hit.ta</i>	<i>*<u>hi</u>.hit.ta</i>	‘make a fire’
(2.2e)	<i>b^wal.ko.te</i>	<i><u>b^wal</u>.b^wal.ko.te</i>	<i>*<u>b^wa</u>.b^wal.ko.te</i>	‘soften, smooth’

As mentioned above, in no case does CVC reduplication ever occur when the initial syllable of the stem is CV; thus, **hin-hi.nu* and the like are impossible reduplication forms in Hiaki regardless of the morphological structure of the stem. This makes Hiaki syllabic reduplication seem to be sensitive to the prosodic (syllabic) structure of the verb stem.

H&L (2009: 244-5), on the other hand, present a wealth of data to show that syllabic reduplication of the CVC type usually (but not exclusively) involves apparent suffixes of the form *-ta* or *-te*, as in (2.2*b-d*). In addition, in many cases these involve the final sequence of CV-*hta* or CV-*kta* (as in 2.2*c*).⁴ H&L propose the following descriptive generalization to give a MORPHOLOGICAL account for most cases of CVC reduplication. A morphological account along these lines would unify this class of reduplication with the class involving disyllabic reduplication (cf. 1*c*):

(3) H&L's generalization for patterns 1*a-1c* (Harley and Leyva 2009: 246 [9])

(3*a*) When a verb contains one of the transitivity-marking suffixes *-te* or *-ta*, attached either to a closed-syllable root or to a bisyllabic root followed (optionally) by a *-k* or *-h* coda consonant, reduplication copies the entire verb root.

(e.g. *čamta* 'mash' → *čam-čamta*, where the morphological structure is [čam_√-ta_v] and *čitohte* 'slip' → *čito-čitohte*, where the morphological structure is [čito_√-h₇-te_v]).

(3*b*) Elsewhere, reduplication consists of a single light syllable which copies the onset and first vowel of the verb stem.

Such an account is derivable within a decompositional approach to word morphology, where roots are separable from their various inflectional and derivational suffixes. If we follow H&L in making the plausible assumption that the frequently observed word-final sequences of *-ta* and *-te* are indeed some kind of suffix, which is probably true at least diachronically, and further, if

the frequent (“optional”) word-medial, syllable-closing *–h–* and *–k–* are some kind of thematic suffix (or some such other morphology which would exclude that segment from the structure of the root), then the reduplication forms discussed by H&L may indeed be targeting the root only. It should be noted, however, that many single syllable reduplicants also involve stems which have first syllables which are closed by *–h–* or *–k–*, and these coda consonants can still be reduplicated under syllabic reduplication—cf. example *čuk-čukta* in (2.2c). The question then arises as to when such syllable-closing codas should be analyzed as part of the root or not. I am not aware of any theory-neutral criteria to settle this question for Hiaki. Such a question does not arise at all, though, on the prosodically-based account which only recognizes the fact that the first syllable of the stem is closed, thus allowing for the reduplicant itself to also be closed.

Even if we accept H&L’s assumptions about the morphological decomposition of verbs in Hiaki, their generalization in (3) is not sufficient to accommodate all cases of Hiaki (non-geminating) syllabic and disyllabic reduplications. Two forms from H&L’s corpus, as reported in their article, do not readily fit this pattern and are not otherwise amenable to a morphological decompositional analysis (i.e. they do not evince clear evidence for “root” reduplication”):

(4) Exceptions to (3) from H&L’s corpus

Verb	Reduplication	Verb Meaning
<i>’at.b^wa</i>	<i>’at-’at.b^wa</i>	‘laugh at’
<i>’et.b^wa</i>	<i>’et-’et.b^wa</i>	‘steal, rob, burglarize’

These wordforms, which both end in the sequence *–b^wa*, may at first appear to be morphologically decomposable. However, as far as I know there is no independent meanings for the initial elements *at-* or *et-*. There happens to be a Hiaki verbal root *b^wa-* ‘eat’ (cognate with other Uto-Aztecan verb roots for ‘eat’, such as Classical Nahuatl *-k^wa-*), which appears in such

Hiaki verbs as *b^wa'e* ‘eat’ (transitive) and *hi'ib^wa* ‘eat’ (intransitive, where the prefix *hi'i-* indicates an unspecified object). However, given the lack of independent uses for *at-* and *et-* as well as the lack of semantic congruence between these words for ‘laugh at’ and ‘steal, rob, and burglarize’ with relevant meanings associated with the root for ‘eat’, I see no reason to decompose these verb stems into smaller morphological units, and thus regard syllabification as the most likely explanation for what gets copied in reduplication for these words.

In addition, the above examples (2.2a) and (2.2e), *vam-vam.se* and *b^wal-b^wal.ko.te*, respectively, from Molina et al. (1999) and cited in Haugen (2003), also do not conform to the generalization given in (3). As noted by H&L (p.247), the combining stem form of *vam.se* ‘hurry’ is *vam.si-*, suggesting that the root is in fact larger than *vam-*, which is what gets reduplicated. Similarly, the word *b^wal.ko.te* ‘soften’ is composed of a clear adjectival root, *b^wal.ko* ‘soft’, plus a productive verbalizing suffix *-te* ‘MAKE’. Given (3), the reduplication form for *b^wal.ko.te* should either be the entire root (**b^wal.ko-*) or just the first consonant and vowel (**b^wa-*). Instead, the reduplicant is a copy of the entire first syllable, i.e. *b^wal-*. This is, then, another case where reference to the syllable structure of the stem is the most parsimonious way to account for what gets copied in reduplication.

Another class of exceptions includes those cases of single syllable reduplication for polysyllabic root forms which also exist, such as (2.1d, 2.1e), and, like other cases of Hiaki syllabic reduplication, all of these observe the proscription against creating codas if the first syllable of the stem is not already closed (thus, **hew-he.wi.te* ‘say yes, agree’ from *he.wi* ‘yes’ + *-te_v* ‘MAKE’; and **ko'-ko. 'a.rek* ‘wear a skirt’ from *ko. 'a.rim* ‘skirt’ + *-ek_v* ‘PERF/HAVE’). All of these exceptions can be accounted for, though, if we allow the grammar to notice the fact that what is being reduplicated in these examples is identical to the first syllable of the verb stem—

i.e. these exceptions can be explained by making reference to the prosodic (syllabic) structure of the verb stem.

Regarding the issue of the potential importance of the prosodic structure of the verb stem in Hiaki reduplication, H&L state:

It is certainly worth noting that there is no case of CVC reduplication in which a reduplicant copies phonological material of the Base that is itself not already part of a CVC initial syllable; *all* closed-syllable reduplicants are formed from verbs containing initial CVC syllables. In other words, syllabic reduplication in Hiaki *never* copies onset material from the second syllable of a Base into a coda position in the reduplicant.

(p. 247, emphasis added).

Thus, even in H&L's morphologically-centered analysis the actual prosody of the stem ("base") is not totally irrelevant in Hiaki reduplication.

One of H&L's motivations for not regarding CVC reduplication as being prosodically-driven is the fact that this analysis may entail that coda consonants in such examples are non-moraic—this was in fact proposed in Haugen (2003) following Demers, Escalante, and Jelinek (1999). This in turn would have the consequence that Hiaki may have some monomoraic roots.

On this point H&L note:

If the final coda consonant in these CVC roots is not moraic, then these would be the only significant class of monomoraic roots in the language (unless, of course, they are not roots; *in that case the evidence for prosodically driven reduplicant shape would be overwhelming*). We suggest that a moraic analysis of these consonants *should at least be considered*. (p. 248, emphasis added)

Since the roots at hand never appear alone (i.e. without the phonological support of additional suffixes, such as *-ta* or *-te*), that is, since these roots never appear alone as a free root word with only one mora, it is not clear why it should be problematic for these roots to be monomoraic.⁵ Haugen (2003) considers codas to be generally non-moraic in Hiaki and thus CV and CVC reduplicants are both composed of light syllables.

Haugen (2003) and H&L (2009) share the goal of reducing the different Hiaki reduplication forms into as few generalizations as possible. On the one hand, H&L aim to link the CVC (RED_{CL}) class to the disyllabic (RED_{SS}) class under the MORPHOLOGICAL category of “root reduplication” to the exclusion of the CV (RED_S) class, which is given the prosodic definition of “light syllable” reduplication. Haugen (2003), on the other hand, links the CV and CVC classes together under the PROSODIC category of “light syllable” reduplication to the exclusion of the CV.CV reduplication class (H&L’s “RED_{SS}”), which is given the morphological definition of “root reduplication”. This contrast is illustrated graphically in Figure 1, where the two approaches to the RED_{CL} class are distinguished by different links from analysis type to the (b) examples:

I. H&L (2009)

Reduplication Type	Verb Stem	Gloss		Reduplicated Form	Analysis Type
(a) RED _S	<i>hi.nu</i> _√	‘buy’	→	<u>hi</u> - <i>hi.nu</i> _√	← Prosodic: RED=σ _μ (~ CV)
(b) RED _{CL}	<i>čam</i> _√ - <i>ta</i> _v	‘mash’	→	<u>čam</u> - <i>čam</i> _√ - <i>ta</i> _v	↙ Morphological: RED=√
(c) RED _{SS}	<i>či.to</i> _√ - <i>h</i> _? - <i>te</i> _v	‘slip’	→	<u>či.to</u> - <i>či.to</i> _√ - <i>h</i> _? - <i>te</i> _v	↘

II. Haugen (2003)

Reduplication Type	Verb Stem	Gloss		Reduplicated Form	Analysis Type
(a) RED _S	<i>hi.nu</i>	‘buy’	→	<u>hi</u> - <i>hi.nu</i>	↙ Prosodic: RED=σ _(μ) (~ CV or CVC)
(b) RED _{CL}	<i>čam.ta</i>	‘mash’	→	<u>čam</u> - <i>čam.ta</i>	↘
(c) RED _{SS}	<i>či.to</i> _√ - <i>h</i> _? - <i>te</i> _v	‘slip’	→	<u>či.to</u> - <i>či.to</i> _√ - <i>h</i> _? - <i>te</i> _v	← Morphological: RED=√

FIG.1.—Different approaches to the Hiaki reduplicative patterns in (1a)–(1c).

The spirit of both analyses discussed here seems to be the same: some cases of reduplication require reference to the morphological structure of the stem (i.e. the root must be identified), while other cases can be left to a prosodic description. These analyses differ on the nature of the prosodic description that must be invoked—for H&L the prosodic description is a light syllable (σ_μ, which for them can be a CV only), whereas for Haugen (2003) the same σ_μ could be either CV or CVC. The disconnect revolves around whether or not coda consonants in Hiaki must be moraic.

One argument in favor of the non-moraic status of coda consonants in Hiaki comes from the quantity-sensitive nature of accent-placement in the language. Accent placement in Hiaki is sensitive to moras, wherein a high tone attaches to either the first or second mora of the word (cf. Demers et al. 1999), whether reduplicated or otherwise. Which mora the accent is placed on is lexical (cf. Demers et al. 1999).⁶ Hiaki RED_{S+G} reduplication, which is the form of syllabic reduplication which induces gemination between the reduplicant its base as in (1*e*), ALWAYS attracts the high tone to the reduplicant, which is always the first syllable of the word. Therefore, the first syllable of words displaying this reduplication pattern must be composed of two moras, and the accent must be on one of those two moras. For this reason Haugen (2003) regards the RED_{S+G} pattern of reduplication as “heavy syllable” reduplication, wherein the syllabic reduplicant necessarily contains two moras. This means that RED_{S+G} has different weight properties than either RED_S or RED_{CL} reduplicants, which is desirable. Unlike RED_{S+G} reduplication, the latter reduplication types do not necessarily attract the accent and so they do not exhibit the heavy moraic weight to which the accent is sensitive.⁷

Since the accent (high tone) is attracted to the word-initial heavy syllable in RED_{S+G} reduplication, accent placement in Hiaki is at least to some degree quantity-sensitive. If Hiaki coda consonants are actually moraic, therefore, we should then expect that closed syllable roots containing them would also attract the high tone to the first syllable, parallel to the attraction generated by RED_{S+G} reduplication. But this is not the case—not all initial closed syllables in Hiaki are necessarily accented on that first syllable (cf. 5*a*), and words with closed second syllables can still be accented on the first syllable (cf. 5*b*).

(5) Hiaki accent is not always attracted to closed syllables

(5a) *al.lé.a* ‘happy’ (Demers et al. 1999: 41 [1-B-i])

(5b) *wá.suk.ti.a* ‘year’ (Demers et al. 1999: 41 [1-B-v])

We thus infer that one of H&L’s primary motivations for discounting a prosodically-based account of Hiaki syllabic reduplication does not inevitably compel us to that particular conclusion.

We now return to the possibility that it is the syllable structure of the verb stem that is relevant to many cases of reduplication in Hiaki, which is an avenue of analysis that H&L leave open as a plausible alternative to their root-based analysis. In further support of this idea we observe that the language has some polysyllabic verb stems where the root can be shown to exist independently as a (minimally) disyllabic form, but wherein the reduplicant is still monosyllabic and, as elsewhere, is dependent upon the syllable structure of the stem for reduplication. Just like the cases illustrated above in (2), if the first syllable of a disyllabic root is CV then the reduplicant is CV; if the first syllable is CVC, then a coda can be copied to yield a CVC reduplicant. An onset to the second syllable may not be copied to create a coda for a CV reduplicant in any case. Examples (6) and (7) demonstrate polysyllabic verb stems with variant CV and CVC patterns. Cases where there is a clear root appearing in a derived form are differentiated from other cases in (6.1) vs. (6.2) and in (7.1) vs. (7.2), respectively. The forms in (2) above are repeated here for convenience, along with other examples; forms are from Molina et al. (1999) unless otherwise noted:

(6) Hiaki polysyllabic verb stems with syllabic reduplication I: RED ~ CV (RED_S)

(6.1) Derived Hiaki wordforms with clearly identifiable roots

(6.1a) *he.wi.te* ‘say yes, agree’ → *he*-*he.wi.-te* (**hew*-*he.wi.-te*)

- < $\sqrt{he.wi}$ ‘yes’ + *-te* ‘make’
- (6.1b) $b^w a.wi.te$ ‘sharpen’ → $\underline{b^w a}-b^w a.wi.te$ (* $\underline{b^w aw}-b^w a.wi.te$)
- < $\sqrt{b^w a.wi}$ ‘sharp’ + *-te* ‘make’
- (6.1c) $hi.oh.te$ ‘write about’ → $\underline{hi}-hi.oh.te$ (* $\underline{hih}-hi.oh.te$)
- < $\sqrt{hi.o.si.a}$ ‘paper’ + *-te* ‘make’
- (6.1d) $hi.pet.te$ ‘make mats’ → $\underline{hi}-hi.pet.te$ (* $\underline{hip}-hi.pet.te$)
- < $\sqrt{hi.pe.tam}$ ‘bed’ + *-te* ‘make’
- (6.1e) $hi.ru.ke$ ‘play musical rasp’ → $\underline{hi}-hi.ru.ke$ (* $\underline{hir}-hi.ru.ke$)
- < $\sqrt{hi.ru.ki.am}$ ‘rasp (musical)’ + *-e* (Instrumental suffix)
- (6.1f) $na.wi.te$ ‘weaken someone’ → $\underline{na}-na.wi.te$ (* $\underline{naw}-na.wi.te$)
- < $\sqrt{na.wi.a}$ ‘weakling, coward, scaredy-cat’ + *-te* ‘make’

(6.2) Possibly derived wordforms, but without clearly identifiable roots

- (6.2a) $ha.soh.te$ ‘breathe hard’ → $\underline{ha}-ha.soh.te$ (* $\underline{has}-ha.soh.te$)
- (6.2b) $he.'ok.te$ ‘have the hiccups’ → $\underline{he}-he.'ok.te$ (* $\underline{he}'-he.'ok.te$)
- (6.2c) $'i.čak.te$ ‘get bored of’ → $\underline{i}'-i.čak.te$ (* $\underline{it}'-i.čak.te$)⁸
- (6.2d) $'i.vak.ta$ ‘cuddle, hug, embrace’ → $\underline{i}'-i.vak.ta$ (* $\underline{iv}'-i.vak.ta$)
- (6.2e) $na.son.te$ ‘harm one, ruin, spoil’ → $\underline{na}-na.son.te$ (* $\underline{nas}-na.son.te$)
- (6.2f) $re.mo.a$ ‘alternate’ → $\underline{re}-re.mo.a$ (* $\underline{rem}-re.mo.a$)
- (6.2g) $te.ha.le$ ‘use up, finish’ → $\underline{te}-te.ha.le$ (* $\underline{teh}-te.ha.le$)
- (6.2h) $ve.čeh.ta$ ‘roll up pants / sleeves’ → $\underline{ve}-ve.čeh.ta$ (* $\underline{vet}-ve.čeh.ta$)

(7) Hiaki polysyllabic stems with syllabic reduplication II: RED ~ CVC

(7.1) Derived Hiaki wordforms with clearly identifiable roots

- (7.1a) $b^w al.ko.te$ ‘soften’ → $\underline{b^w al}-b^w al.ko.te$

< $\sqrt{b^w al.ko}$ ‘soft’ + *-te* ‘make’

(7.1b) *tah.kae* ‘make tortillas’ → *tah-tah.kae* (Martínez Fabián 1994)

< $\sqrt{tah.kaim}$ ‘tortilla.PL’

(7.2) Possibly derived wordforms, but without clearly identifiable roots

(7.2a) *'at.b^wa* ‘laugh at’ → *'at-**'at. b^wa* (H&L 2009)

(7.2b) *'et.b^wa* ‘steal, rob, burglarize’ → *'et-**'et. b^wa* (H&L 2009)

It should be emphasized that single syllable reduplication involving disyllabic roots does not seem to be all that common in the language—most (but of course not all) of these roots reduplicate either the entire root itself, if the morphological decomposition suggested in Haugen (2003) and H&L (2009) is correct, or possibly the first foot of the stem if not (which would require that any second syllable codas be extra-metrical for the purposes of reduplication). Further, CVC-initial syllables also do not seem to be very common in the language as whole, whether the verb stem is di- or tri-syllabic; the examples presented in (6) and (7) above are what I was able to collect from Molina et al. (1999), which contains hundreds of verb forms. More examples might be able to be elicited from derived contexts, such as deadjectival and denominal verbs of the type illustrated by *b^wal.ko.te* ($\sqrt{b^w al.ko}$ ‘soft’ + *-te* ‘verbalizer’) and other roots that are able to be verbalized through suffixation.

The conclusion that I draw from the above set of facts is the following. While I entirely agree with H&L that a morphological break-down of disyllabic stems into root plus suffix is plausible, at this point this morphological decomposition is not necessarily the only possible account for these data. The exceptions to H&L’s generalization in 0 suggest that, at least for some cases of reduplication in Hiaki, reduplication is in fact dependent upon the syllabic

structure of the verb stem. That is to say, some cases of reduplication in Hiaki somehow demarcate the first syllable, and not the entire morphological root, for reduplication.

If a prosodic analysis of reduplication in Hiaki is necessary, might it also be sufficient? As it turns out, there exists some inter-speaker variation in what gets copied in reduplication for some individual verb stems. H&L note that:

in nearly every case in which a difference exists between the [Molina et al. 1999] dictionary and [H&L's] database, the dictionary specifies light-syllable [i.e. CV] reduplication in contrast to the database's closed syllable or disyllabic reduplication. On the assumption that light-syllable reduplication is the default, elsewhere form, a shift toward light reduplication would be a natural "overgeneralization" pattern produced by speakers who might perhaps have reanalyzed certain of these ROOT + *te/ta* verbs as monomorphemic, or who might not implement root reduplication as a general subpattern of certain morphological classes of stems but rather as an irregular form marked for individual lexical items. (p. 250)

(An example of the very variation at issue occurs with respect to two of H&L's counterexamples in 0, the reduplications of which are recorded in Molina et al. 1999 as 'a- 'at.b^wa and 'e- 'et.b^wa, rather than H&L's 'at- 'at.b^wa and 'et- 'et.b^wa).

As H&L suggest, the CV variants of verb stems with initial CVC syllables can be accounted for if the CV pattern is the default reduplication pattern made available by the language. This would mean that there could be two sources for syllabic reduplication in the language: those cases of reduplication which are dependent on the syllable structure of the verb stem, and those which reduplicate CV independently from the syllable structure of the verb stem.

With this in mind we can modify H&L's generalization by positing two non-default verb classes, as follows:

(8) Modified generalization for patterns (1*a*)-(1*c*) – cp. (3)

(8*a*) If a verb stem is in Class I, it copies the entire verb root. (Thus, if a verb contains one of the transitivity-marking suffixes –*te* or –*ta*, attached either to a closed-syllable root or to a bisyllabic root followed (optionally) by a –*k* or –*h* coda consonant, reduplication copies the entire verb root and ignores the –*k* or –*h* coda consonant and the final suffix).

(cf. H&L 2009: 246 [9*a*])

(8*b*) If a verb stem is in Class II, it copies the initial syllable of the verb stem (thus, it may appear as a CV or CVC, depending on the syllable structure of the verb stem).

(cf. examples in 6 and 7 above)

(8*c*) Elsewhere, reduplication consists of a single light syllable which copies the onset and first vowel of the verb stem.

A more full description of the patterns in (1) would also need to add two additional classes to account for the patterns in (1*d*) and (1*e*). These additional statements are given in (9).

(9) Additional generalizations to account for the Hiaki reduplicative allomorphs

(9*a*) If a verb stem is in Class III, it adds a single mora to the first syllable, thus causing gemination, or lengthening of the initial vowel if gemination would result in an illicit word-medial consonant cluster.

(cf. examples like 1*d* above);

(9*b*) If a verb stem is in Class IV, it reduplicates a CV and triggers gemination of the onset of the stem into the coda of the reduplicant.

(cf. examples like 1*e* above)

At this point there does not seem to be any reason to order the statements in (8) and (9); the key feature that would capture the spirit of the analysis posited by H&L is that there is a default pattern to capture the “elsewhere” cases. In this way the Hiaki lexicon would contain some verb roots marked for certain class feature diacritics of some type which would specify some special kind of reduplication: root reduplication, cf. (8a); syllable reduplication, cf. (8b); morphological mora augmentation (i.e. morphological gemination or vowel-lengthening), cf. (9a); or light syllable reduplication plus gemination at the reduplicant-base juncture, cf. (9b). Unmarked verb stems would then take default CV reduplication, cf. (8c). The only novel addition being proposed here is statement (8b), which would make some subclass of Hiaki verb stems sensitive to the prosodic (syllabic) structure of their base, as per the data in (2), (4) and (7) above. This addition would have the clear benefit of promoting H&L’s stipulated and unprincipled lexical exceptions to a sub-class of reduplication which is motivated by phonological regularity.

Another feature of the present analysis is that some cases of syllabic reduplication will be ambiguous, and an intriguing question is then raised: Are CVC reduplicants evidence for copying a root or for copying a syllable? Similarly, is CV reduplication in CV-initial roots a copy of the first syllable of the stem or an instance of the default emergence of a CV reduplicant? I think that the answer to these questions is that the grammar itself, if correctly modeled above, does not have to dictate one way or the other. This ambiguity of analysis should not be as disturbing as it might first appear, though, because I think that the same ambiguity of analysis is also available to the language learner and user. Thus, speakers must make a decision about what should be copied for each verb stem (or decide that a particular verb stem is in the default class), and for this reason it should not be completely surprising that there would be some inter-speaker

variation for particular verb stems. Indeed, such variation, documented for Hiaki reduplication above in our discussion of some differences between the two major corpora of reduplication, is probably expected given the varying possibilities for copying made available by Hiaki grammar.

A major benefit of an analysis along the lines proposed here is that ALL of the attested patterns of reduplication in Hiaki are accounted for and regarded as phonologically regular. Further, just as crucially, NONE of the statements given in (8) or (9) above would lead to unattested CVC reduplication forms like **hin.hi.nu*. As mentioned above, no reduplication form in either major corpus allows for the onset of the second syllable of the verb stem to serve as a coda in a CVC reduplicant.

The conclusion that I think should be drawn from this discussion is that an adequate account of Hiaki reduplication must allow the grammar to access two kinds of information for different word classes: morphological (i.e. root identification) AND prosodic (i.e. syllable structure identification). This conclusion should not be controversial to those who have studied Hiaki grammar since appeals to both domains have already been proposed in particular analyses in the literature (cf. Figure 1 above). More general implications of the foregoing discussion will be addressed in the next section.

3. Implications. We can (and will) separate the implications of our discussion into two categories: (i) those of a typological (i.e. empirical) nature pertaining to the possible types of reduplication that exist cross-linguistically (§ 3.1), and (ii) those which pertain more to different analytical (i.e. theoretical) approaches to reduplication phenomena cross-linguistically (§ 3.2).

3.1. Typological implications. The point of our discussion of the Hiaki data described above is the following: Hiaki reduplicants can be sensitive, in some cases and to some extent at least, to the syllabic structure of the stem to which reduplication applies. Excepting the case of

gemination-inducing heavy syllable (RED_{S+G}) reduplication, consonants in the stem may not serve as codas in the reduplicant unless they also appear as codas in the stem.⁹ Similar sensitivity to the prosodic structure of the first two syllables (foot) of the stem is well-known from the Australian language Yidin^y (Pama-Nyungan; ISO 639-3 yii), cf. (10); this example has been extensively discussed in the literature (see, e.g. Marantz 1982, McCarthy and Prince 1986, 1995, et seq.).

(10) Yidin^y disyllabic reduplication (Dixon 1977, cited in McCarthy and Prince 1986)

(10a) *kin.tal.pa* ‘lizard sp.’ → *kin.tal.kin.tal.pa* **kin.ta.kin.tal.pa*

(10b) *mu.la.ri* ‘initiated man’ → *mu.la.mu.la.ri* **mu.lar.mu.la.ri*

These Yidin^y examples show that copying two syllables is possible in this language, cf. (10a), but creating a coda consonant for the second syllable of the reduplicant from the onset of the third syllable of the stem is impossible, cf. the ungrammatical example in (10b). Simply put, the third syllable of the stem seems to be beyond the scope of reduplicative copying in Yidin^y. This conclusion is well-known and is uncontroversial.

However, prosodic sensitivity to the stem at the level of one syllable seems to be quite rare. In fact, theoretical work following the surveys of Moravcsik (1978) and Marantz (1982), e.g. various work by McCarthy and Prince and others, has maintained that this pattern is completely non-existent. Marantz (1982), for example, poses the following question from his C- and V- skeleton-driven approach to reduplication. Although Marantz’s postulation of a process utilizing a syllabic node in addition to C- and V- nodes

leads to an elegant unification of C-V skeleton with full stem reduplication and of both of these with normal affixation, it nonetheless leaves us with a mystery. Why, of all the reduplication processes studied by Moravcsik, myself [i.e. Marantz], and others, is there

only one clear example of syllabic reduplication (namely, Yidin^y)? (Marantz 1982: 456) (We will see below that more recent work, e.g. Frampton 2009, regards the relevant structure of Yidin^y as being a Prosodic Word, rather than just two syllables).

Nearly two decades later, McCarthy and Prince (1998) offer similar commentary on the issue of the (non-)existence of syllable-based reduplication:

On the face of it, the idea that reduplication involves affixing a template may seem surprising, since a natural, naïve expectation is that reduplication involves an operation like "copy the first syllable", as illustrated in [i]:

[i] "Copy first syllable," hypothetically

ta.ka ⇒ ta-ta.ka

tra.pa ⇒ tra-tra.pa

tak.pa ⇒ tak-tak.pa

Moravcsik (1978) and Marantz (1982) observe that syllable copying, in this sense, does not occur. Rather, reduplication always specifies a *templatic target* which is affixed to the base, and is satisfied by copying elements of the base.

(McCarthy and Prince 1998: 286, original emphasis)

Given these views of the possible types of reduplication, a pattern such as Hiaki's distinction between hi-hi.nu and vam-vam.se, where the copying of a coda consonant for a CVC reduplicant is allowable only if the reduplicant's coda is also a coda in the stem, should simply not exist.

In order to properly assess the status of the claim that a syllable-based reduplication pattern neither exists nor is possible, it would be fruitful to first take a moment to examine where such a claim originally emerged. The locus classicus of this claim is the seminal survey of cross-

linguistic reduplication patterns provided by Moravcsik (1978). Because there is some disagreement about precisely what Moravcsik claims in the presentation of her findings (see, for example, Frampton 2009: 209, endnote 8), it will be useful to look back in some detail at what Moravcsik actually said.

3.1.1. Re-assessing Moravcsik (1978)'s findings regarding "syllable copy"

reduplication. Moravcsik (1978) presents a very influential survey of the typology of the forms and functions of reduplication patterns cross-linguistically, as part of Joseph Greenberg's Stanford Universals Project in the 1970s. Moravcsik's findings come from a very thorough, but necessarily limited, language sample. Although it is not clear how many languages Moravcsik actually looked at in her survey, by my count she actually cites reduplication data from more than fifty languages and dialects in her published paper; I think that it is safe to assume that she actually examined a significantly higher number than that over the course of the project.

According to Moravcsik's survey:

reduplicated phonetic strings [she] found invariably defined in reference to consonant-vowel sequences and absolute linear position. In other words, all such specifications are of the type: 'reduplicate the first C and V of the word' or 'reduplicate the middle C' and never of the type: 'reduplicate the first two segments (regardless of whether they are consonants or vowels)' or 'reduplicate the second voiced fricative'. (pp. 307-8)

Moravcsik goes on to note that her sample does not include examples where syllable structure, rather than linear ordering of C's and V's, determines the shape of the reduplicant. She states:

Evidence that would indicate the necessity of a syllabic definition would be a language where in VC-, CVCV-, and CVCCV- initial words the V, CV and CVC sequences are reduplicated, respectively; since in this case the syllable would provide the only uniform

definition of the three otherwise disparate strings. (p. 311)

Based on her findings, Moravcsik concludes the following:

I therefore take all facts cited here to be consistent with the hypothesis that the only phonetic properties that partial reduplication rules may refer to are consonantality and vowelhood; and that all partial reduplication rules where the part to be reduplicated is not syntactically defined do in fact make such reference. (p. 312)

I suspect that Moravcsik could well have drawn a different conclusion had data from Hiaki (or another language) illustrating the patterns observed in examples (2), (4), and (6)-(7) been available in her sample. As things stand, however, based on her survey of a sample of languages from across the world Moravcsik concluded that the shape of the reduplicant is generally not dependent on the prosodic structure of the stem to which reduplication applies. Rather, templatic requirements (e.g. C-V- skeleta, in Moravcsik's framework) specify what the reduplicant should be, and, under her assumptions, the reduplicant should copy from the stem as necessary to meet that templatic requirement. Reduplication forms alternating in CV and CVC, depending on the nature of the first syllable of the stem (i.e. CV or CVC), are not expected since this pattern is unattested in Moravcsik's sample of 50+ languages.

The point that I would like to emphasize here is the usage to which Moravcsik's generalizations have since been put. Moravcsik herself summarized one of the goals of her paper as follows: "Some generalizations that have proved to be *exceptionless within a limited cross-linguistic sample* are proposed as *tentative* language universals" (p.297, emphasis added). However, Moravcsik's supposedly tentative language universal regarding the lack of possibility for prosodic delimitations on reduplicative copying is still often taken to be an EXCEPTIONLESS language universal, as the quotations from subsequent scholars provided above illustrate.

In the same set of volumes from the Stanford Universals Project where Moravcsik's survey appeared, in his article on sampling methodology Bell (1978) observes that "a sample of languages obviously cannot establish that a language type is impossible. The investigator can ask, though, how large a sample is needed to make it likely that an example of the type will turn up if it does exist" (p. 143). To my knowledge Bell's second point, regarding sample size, has not been addressed in previous discussions pertaining to syllable-based reduplication, although it should be clear that such an issue is critical when one wishes to claim that a given morphological pattern is an exceptionless universal given its non-existence in a limited language sample.

With respect to Bell's first point, though, I think that the same thing can be said in regard to specific morphological patterns, such as prosodic sensitivity to the syllabic structure of the stem in reduplication. Irrespective of the issue of likelihood, however, only one example of a particular pattern need actually be identified in order to establish the existence of that pattern in natural language.¹⁰ I hope to have shown that such a pattern does exist at least for one class of examples in Hiaki reduplication. Despite protest to the contrary in different discussions in the literature, similar examples can indeed also be found in other languages.

3.1.2. Sensitivity to the syllable structure of the stem in syllabic reduplication beyond Hiaki. Reduplication dependent upon the syllable structure of the stem is robustly attested in at least two other languages that I know of: Yapese (Oceanic; ISO 639-3 yap) and Mayo (Uto-Aztecan; ISO 639-3 mfy).

Based on her own field data, Ballantyne (1999) argues that Yapese has syllable-copy reduplication of the type which shows that reduplicants are sensitive to the syllabic structure of their base—stems with CV-initial syllables reduplicate a CV syllable, but CVC-initial syllables reduplicate a CVC syllable.

(11) “Syllable copy” Reduplication in Yapese (Oceanic, Austronesian) (Ballantyne 1999)

(11.1) CV- initial stems

(11.1a) *tsu.ŋu:r* → *tsu.tsu.ŋu:r* **tsuŋ.tsu.ŋu:r*

‘to slap’ ‘to slap hard’

(11.1b) *ɔɭ.ʔaβ* → *ɔɭ.ɔɭ.ʔaβ* **ɔɭʔ.ɔɭ.ʔaβ*

‘to cut’ ‘to slice’

(11.2) CVC- initial stems

(11.2a) *te:j* → *te:j.te:j* **te.te:j* and **te:.te:j*

‘to stare’ ‘to stare repeatedly’

(11.2b) *suɣ.ʔa:l* → *suɣ.suɣ.ʔa:l* **su.suɣ.ʔa:l*

‘to be slow’ ‘to be very slow’

Examples like those in (11) clearly illustrate the possible existence of the supposedly impossible pattern of “syllable copy” reduplication in Yapese.

Mayo is the closest living Uto-Aztecan relative to Hiaki. Despite some degree of mutual intelligibility between the two languages, the reduplication system of Mayo is somewhat different from that of Hiaki. The crucial difference hinges on the fact that coda consonants in Mayo are moraic. Like Hiaki, Mayo has two classes of verb stems which differ based on the location of the accent: the first or second syllable. Hagberg (1993) refers to these two classes as the “accented” and the “unaccented” classes, respectively. Also like Hiaki, Mayo exhibits two patterns of reduplication: light vs. heavy syllable. Unlike the case in Hiaki, and non-typically for Uto-Aztecan languages more generally (cf. Haugen 2005, 2008), the weight difference between reduplicants seems not to correspond to different semantic functions in Mayo, at least for most younger speakers for whom the light and heavy reduplicants seem to appear in free variation (cf.

Hagberg 1993: 241). The interactions of the two differently weighted reduplicant types in both classes are illustrated in (12) and (13):

(12) Mayo accented words: Gemination at RED-Base juncture (Hagberg 1993)

Stem	RED1= σ_μ	RED2= $\sigma_{\mu\mu}$	Unattested	Gloss
(12a) <i>yú.ke</i>	<u>yú</u> . <i>yu.ke</i>	<u>yúy</u> . <i>yu.ke</i>	* <u>yúk</u> . <i>yu.ke</i>	‘rain’
(12b) <i>wóm.te</i>	<u>wó</u> . <i>wom.te</i>	<u>wóm</u> . <i>wom.te</i>	* <u>wów</u> . <i>wom.te</i>	‘be frightened’
(12c) <i>nók.wa</i>	<u>nó</u> . <i>nok.wa</i>	<u>nók</u> . <i>nok.wa</i>	* <u>nón</u> . <i>nok.wa</i>	‘known language’
(12d) <i>nó.ka</i>	<u>nó</u> . <i>no.ka</i>	<u>nón</u> . <i>no.ka</i>	* <u>nók</u> . <i>no.ka</i>	‘know a language’

(13) Mayo unaccented words: Copy from second syllable of stem (Hagberg 1993)

Stem	RED1= σ_μ	RED2= $\sigma_{\mu\mu}$	Unattested	Gloss
(13a) <i>bwa.ná</i>	<u>bwa</u> . <i>bwá.na</i>	<u>bwan</u> . <i>bwá.na</i>	* <u>bwab</u> . <i>bwa.na</i>	‘cry’
(13b) <i>bwi.ká</i>	<u>bwi</u> . <i>bwí.ka</i>	<u>bwik</u> . <i>bwí.ka</i>	* <u>bwib</u> . <i>bwi.ka</i>	‘sing’
(13c) <i>ʔom.té</i>	<u>ʔo</u> . <i>ʔóm.te</i>	<u>ʔom</u> . <i>ʔóm.te</i>	* <u>ʔoʔ</u> . <i>ʔom.te</i>	‘hate’
(13d) <i>no.ká</i>	<u>no</u> . <i>nó.ka</i>	<u>nok</u> . <i>nó.ka</i>	* <u>non</u> . <i>no.ka</i>	‘speak’

Light syllable reduplication in both word classes yields a CV reduplicant, as expected, cf. the second column of (12) and (13). Heavy syllable reduplication, however, emerges differently in the two classes. CVC-initial syllables in both classes can be copied if the initial syllable is CVC (cf. 12b, 12c; and 13c). In cases where the first syllable of the stem is CV, however, the two classes differ in how the heavy syllable is formed via reduplication. In the unaccented class the reduplication process simply copies the onset of the second syllable, as in (13d); this is unlike Hiaki, which, as emphasized above, forbids this type of reduplication for any class of verb stem. Heavy syllable reduplication for the Mayo accented class DOES behave like Hiaki heavy syllable (i.e. RED_{S+G}) reduplication, however, in that the onset of the second syllable of the verb stem is

not available for copying to create a coda in the reduplicant. Rather, the onset of the stem itself must geminate to create the coda, as in (12*a*, 12*d*).

Hagberg (1993) notes that the base for reduplication APPEARS to be different in the two different word classes of Mayo. Namely, the base seems to be at least the first two syllables (i.e. the initial foot) of the unaccented class (if it is not the entire stem), whereas the base appears to be only the first syllable in the accented class. Hagberg is wary of drawing this particular conclusion, however, preferring instead an analysis wherein the base is, contrary to initial appearances, the same in both classes. In Hagberg's analysis the base for reduplication in both classes is the initial foot. In the accented class, though, the initial foot is "degenerate" and is therefore composed only of a single syllable.¹¹ The literature referring to the supposed non-existence of syllable-based reduplication plays a very large role in leading Hagberg to this conclusion. In reference to the possibility that the syllable may be selected as the base for reduplication in the accented class, which under the analysis that he develops would entail that words of this class were footless, Hagberg states:

...this analysis is suspect in light of the fact, reported in Moravcsik 1978 and McCarthy and Prince 1990, that a large amount of descriptive research has failed to turn up a reduplicative process that unambiguously copies a single syllable. As McCarthy and Prince explain, the total absence of such a process indicates that universal grammar does not include the syllable as one of the units which may be utilized as a reduplicative base. (p.250).

Hagberg's conclusion, then, is that the Mayo unaccented class has a reduplicative base that is composed of a foot which itself is made up of two syllables, whereas the accented class, in

contrast, has a reduplicative base that is composed of a foot which is made up of only one syllable.

This is an intriguing theoretical proposition that seems not to bear on the larger empirical issue raised by Moravcsik, however. Moravcsik's generalization, as quoted above, pertains to the consonant- and vowel-hood of the segments involved in reduplication. Moravcsik was not drawing a distinction between foot-oriented reduplicative bases, which independently seem to be needed because of languages like Yidin^y, vs. syllable-oriented bases. None of the empirical facts involving reduplication in Hiaki, Yidin^y, Yapese, or even the Mayo accented class described by Hagberg and discussed here, can be accommodated without some kind of reference to the prosodic structure of the base. (On this point Hagberg's analysis seems to agree, since for him it is crucial that the Mayo reduplicative base is prosodically-defined: it is composed of a foot, even if that foot is "degenerate", i.e. composed of a single syllable).

I hope that the empirical point is clear: reduplication in the Mayo accented class only copies from the first syllable of the stem, therefore a CVC can be copied in heavy syllable reduplication *iff* the first syllable of the stem is of the form CVC. If not, then a CV is copied and gemination from the onset of the stem must create the coda for the reduplicant. This syllable-based generalization, like the situation also described for Hiaki and Yapese above, is in stark contradiction to Moravcsik's hypothesis that "the only phonetic properties that partial reduplication rules may refer to are consonantality and vowelhood" (p. 312). These cases of reduplication indicate that the placement of consonants within syllables can also be relevant: a segment attached to a C node can serve as the coda of a syllabic reduplicant *iff* that segment is also attached to a C node in the coda position of the stem to which reduplication applies. The question of whether or not the initial syllable of the Mayo accented words must be a "degenerate

foot” is an interesting but secondary issue. In any event, under any analysis, the relevant level of prosody for the definition of domain for copying (i.e. “the base”) in the Mayo accented class is, at some level of analysis, the syllable.

The facts from Hiaki, Mayo and Yapese add to a growing body of evidence that Yidin^y is not alone in having a prosodically-defined base for reduplication. As linguists continue to document under-described languages from around the world other supposed universals may also be falsified. Until all extant languages are fully described (or have gone extinct) the corpus of attested languages is not yet closed, and the lessons that little-studied languages can teach us about the possible grammatical structures that the human language faculty makes available cannot yet be considered to be fully learned.

3.1.3. Interim conclusion. My conclusion from the foregoing discussion is that while Moravcsik’s generalization may hold true of the languages in her limited sample, it is falsified by the consideration of languages outside that sample. In this particular case, the empirical generalization that reduplication may not reference the syllable structure of the stem is not borne out, but there seems to be no *a priori* theoretical reason to expect that it should, once we take into account the prosody of the stem (i.e. syllable structure) rather than just the linear sequence of C’s and V’s that make up that stem. Marantz (1982) made this point for disyllabic (foot-based) reduplication in Yidin^y, and we can apply the same logic for single syllable reduplication in Hiaki, Yapese, and the accented word class of Mayo.

A few issues of theoretical importance raised by the Hiaki reduplication facts are the subject of section 3.2.

3.2. Theoretical implications. The purpose of this paper has been to show that some cases of reduplication in Hiaki must make reference to the syllabic structure of the verb stem to

which reduplication applies, contrary to the analysis of Harley and Leyva (2009) who propose to reduce all instances of CVC reduplication in Hiaki to the reduplication of roots. The theoretical ramifications of allowing Hiaki grammar to reference the syllable structure of a stem has been addressed in detail elsewhere (Haugen 2009, 2011, Haugen and Hicks Kennard 2011). I will therefore only briefly review here some of the most important implications of Hiaki syllabic reduplication for current competing theories of reduplication.

Regarding “syllable copy” reduplication, it is important to distinguish two separate issues: (i) the empirical claim about the possible forms of reduplication (i.e. whether or not reduplicants can be sensitive to the prosodic structure of their bases, at the level of the foot, a single syllable, or otherwise); and (ii) the actual mechanisms that different theories make available in order to account for reduplication. Let us consider each of these issues in turn.

With respect to the first, in contrast to the findings of previous typological surveys such as Moravcsik (1978), and the canon of reduplication processes addressed in such theoretical literature as Marantz (1982) and various work by and following McCarthy and Prince (1986, 1990, 1993, et seq.), the data from Hiaki (and other languages) described above suggest that reduplication can indeed be sensitive to the syllable structure of the stem even in single syllable reduplication. In Hiaki this sensitivity may be possible because coda consonants are non-moraic, thus CVC reduplicants can form in environments that also derive CV reduplicants (e.g., “light syllable templates” and related notions).

With respect to the second issue, different theoretical approaches make different predictions about the types of reduplication patterns that should or should not be found in natural languages. With respect to the typologically unusual syllable-oriented reduplication of Hiaki, Mayo, and Yapese, in particular, depending on differing empirical assumptions and architectural

implementations employed by varying theorists, different theories may or may not find it problematic to demarcate prosodically defined portions of the stem, such as feet or syllables, for reduplication. This issue is most easily discussed from the vantage point of defining the “base” for reduplication (i.e. that material of the stem, which may include all or only some sub-portion thereof, which is regarded as the domain for reduplicative copying). We must also address the independent question of whether or not reduplication is “dependent” on a “base” in the first place.

In some theories, such as Shaw (2005)’s implementation of Base-Reduplicant Correspondence Theory (BRCT, following McCarthy and Prince 1995 and much subsequent work), either morphological or prosodic constituents may serve as bases for reduplication. Shaw’s theory explicitly predicts the existence of languages which would target syllables for reduplication. Therefore, if we assume that in Hiaki the first syllable of a stem can be defined as the base which is subsequently fully copied,¹² then the Hiaki CV/CVC syllable reduplication alternation poses no particular problems for this theory.¹³ Indeed, in actually instantiating a predicted kind of base-delimitation these Hiaki data, and data from other languages with similar CV/CVC contrasts in reduplication, actually serve to support Shaw’s approach; see Haugen 2009 and 2011 for further discussion.

Inkelas and Zoll (2005)’s Morphological Doubling Theory (MDT), on the other hand, precludes the situation in which a reduplicant is ever dependent upon the output form of some other stem; they aptly refer to this kind of situation as “base-dependence”. Indeed, MDT does not have “reduplicants” at all. In MDT the correspondence relation between apparent “reduplicants” and their supposed “bases” is a species of Input-Output faithfulness rather than (output- or surface-oriented) Base-Reduplicant faithfulness. The variant CV/CVC syllable

reduplication patterns observed in Hiaki crucially *can* be derived in MDT by stipulating the syllable structure in the input and then allowing for truncation to apply to everything beyond that first syllable in a derivation between the input and the output. In this way the syllabic roles of codas and onsets can be kept consistent between the input and the output. The stipulation of prosodic structure in the input would be a very controversial maneuver, however, as such a move would entail abandoning a commonly held assumption within Optimality Theory that inputs to phonology cannot themselves be constrained—this is the notion of *richness of the base*. (See Haugen and Hicks Kennard 2011 for further discussion of this problem, and other strong evidence from elsewhere against MDT’s proscription against base-dependence).

Finally, Frampton (2009) presents a theory of reduplication couched within the derivational model of phonology developed by Chomsky and Halle (1968), Distributed Reduplication (DR). DR’s central focus on derivation insists that phonological “surface forms are produced by the successive modification of underlying forms” (p. xi). In DR the reduplication process occurs by the phonology inserting “duplication junctures” into the segmental representation of a stem, leading ultimately to multiple links for different segments onto the timing tier, in turn resulting in long-distance geminates. The Hiaki CV/CVC syllable reduplication pattern is relevant to DR because Frampton explicitly forbids base-demarcation of sub-stem bases to the level of a single syllable. The Yidin^y disyllabic pattern is accounted for in DR by demarcating the first foot of the stem as the domain for the reduplication process. This is allowable in DR because the foot is a potential “sub-word” (Prosodic Word) of the stem; since a single syllable is not such a potential sub-word, in Frampton’s view, then it cannot be demarcated as the domain for reduplication.¹⁴ Frampton accounts for the alternating CV/CVC reduplication pattern in Hiaki by incorporating a constraint (“Onset Permanence”, or OnsPerm)

into his grammar. OnSPerm forbids onsets of a stem from serving as codas in a reduplicant. By incorporating this constraint DR is explicitly set up to account for data like that exhibited in the Hiaki reduplicative allomorphy involving CVC and CV syllables. This account is stipulative, however, and is not readily amenable to accounting for Hiaki heavy syllable (RED_{S+G}) reduplication involving gemination from the onset of the stem into the coda of the reduplicant—this is a clear violation of OnSPerm. The relevant generalization for Hiaki is that it is the onset to the SECOND syllable of the stem which cannot serve as a coda in the reduplicant (thus, **hin-hi.nu*, whereas *hih-hi.nu* would be a perfectly acceptable reduplication form in the language).

In sum, different theorists employ different hypotheses about how language “ought” to work, given their prior assumptions about what languages (and language types) actually exist. The prosodically-motivated alternation between CV and CVC reduplication in Hiaki is one case where a typologically rare morphological pattern is either predicted by (and thus confirming of), or is problematic for, different theoretical architectures. This is just another of so many reasons why it is so important for linguists to keep collecting new data from under-studied and under-documented languages, and in turn to keep applying new theoretical understandings to their analyses of such languages.

4. Conclusion. This paper has focused on one debate in the literature on reduplicative allomorphy in Hiaki. Whereas Haugen 2003 proposes a prosodic (i.e. syllable-based) definition for CVC reduplication in Hiaki, Harley and Leyva 2009 propose that CVC reduplication involves copying roots. I have shown here that both analyses fail to account for all cases of reduplication in the language, though, so the claim that I have defended here is that both notions (i.e. root AND syllable) must be utilized by Hiaki grammar.

Our survey of the empirical facts pertaining to syllabic reduplication in Hiaki suggests that both morphological and prosodic constituents of a given stem may be targeted for reduplication in this language. An obvious implication is that both morphological and prosodic constituents must also be possible targets for reduplication cross-linguistically, as well.

Lastly, the facts from alternating CV/CVC syllable reduplication in Hiaki, as well as other languages surveyed here, contradict a well-known cross-linguistic generalization about possible patterns of reduplication. As such, future theoretical work must in some way accommodate the facts from Hiaki and other languages with similar patterns of reduplication demonstrating base-dependence at the level of a single syllable.

REFERENCES

- BALLANTYNE, KEIRA. 1999. Reduplication in Yapese: A case of syllable copying. In C. Smallwood and C. Kitto (eds.), *Proceedings of AFLA VI: The sixth meeting of the Austronesian Formal Linguistics Association*. Toronto: University of Toronto Department of Linguistics, Toronto Working Papers in Linguistics, 17-24.
- BELL, ALAN. 1978. Language samples. In *Universals of Human Language*, vol. 1: Method and Theory, ed. Joseph H. Greenberg. Stanford: Stanford University Press, pp. 123-156.
- CHOMSKY, NOAM, AND MORRIS HALLE. 1968. *The Sound Pattern of English*. Cambridge, MA: The MIT Press.
- DEMERS, RICHARD, FERNANDO ESCALANTE AND ELOISE JELINEK. (1999). Prominence in Yaqui words. *IJAL* 65: 40-55.
- DIXON, R.M.W. 1977. *A Grammar of Yidin*. Cambridge: Cambridge University Press.
- ESCALANTE, FERNANDO. 1985. A preliminary view of the structure of Yaqui. Unpublished MA Thesis, University of Arizona.
- FRAMPTON, JOHN. 2009. *Distributed Reduplication*. Cambridge, MA: MIT Press. (Linguistic Inquiry Monographs 52).
- HAGBERG, LAWRENCE. 1993. *An Autosegmental Theory of Stress*. Ph.D. dissertation, University of Arizona.
- HARLEY, HEIDI, AND MARIA AMARILLAS. 2003. Reduplication multiplication in Yaqui: Meaning X form. In *Studies in Uto-Aztecan*, ed. Luis M. Barragan and Jason D. Haugen, 105-139. Cambridge, MA: MIT Working Papers on Endangered and Less Familiar Languages #5.
- HARLEY, HEIDI, AND MARIA FLOREZ LEYVA. 2009. Form and meaning in Hiaki (Yaqui) verbal reduplication. *International Journal of American Linguistics* 75: 233-72.

- HAUGEN, JASON D. 2003. Allomorphy in Yaqui reduplication. In *Studies in Uto-Aztecan* (MIT Working Papers on Endangered and Less Familiar Languages #5). Cambridge, MA: MITWPL, pp. 75-103.
- . 2004. An opacity problem in Mayo reduplication. *Kansas Working Papers in Linguistics* 27: 113-156.
- . 2005. Reduplicative allomorphy and language prehistory in Uto-Aztecan. In B. Hurch (ed.), *Studies on Reduplication*. Berlin: Mouton de Gruyter, pp. 315-349.
- . 2008. *Morphology at the Interfaces: Reduplication and Noun Incorporation in Uto-Aztecan*. Amsterdam: John Benjamins Publishing Company.
- . 2009. What is the base for reduplication? *Linguistic Inquiry* 40: 505-514.
- . 2011. The syllable as delimitation of the base for reduplication. In Charles E. Cairns and Eric Raimy (eds.), *Handbook of the Syllable*. Leiden: Brill, pp. 129-154.
- HAUGEN, JASON D., AND CATHY HICKS KENNARD. 2011. Base-dependence in reduplication. *Morphology* 21: 1-29.
- INKELAS, SHARON, AND CHERYL ZOLL. 2005. *Reduplication: Doubling in Morphology*. Cambridge: Cambridge University Press. (Cambridge Studies in Linguistics 106).
- MARANTZ, ALEC. 1982. Re reduplication. *Linguistic Inquiry* 13: 435-82.
- MARTÍNEZ FABIÁN, CONSTANTINO. 1994. La reduplicacion nominal en la lengua yaqui de Sonora. In *Estudios en Lingüística y Sociolingüística*, G. Lopez Cruz and Jose Luis Moctezuma Zamarron (eds.), 157-77. Hermosillo: Universidad de Sonora.
- MCCARTHY, JOHN J., AND ALAN S. PRINCE. 1986. *Prosodic morphology*. Ms, University of Massachusetts—Amherst and Rutgers University.

- . 1990. Foot and word in prosodic morphology: the Arabic broken plural. *Natural Language and Linguistic Theory* 8: 209-283.
- . 1993. Prosodic Morphology I: Constraint interaction and satisfaction. Ms, University of Massachusetts—Amherst and Rutgers University.
- . 1995. Faithfulness and reduplicative identity. In *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*, ed. Jill Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk, 249-384. Amherst, MA: Graduate Linguistics Students Association.
- . 1998. Prosodic Morphology. In A. Spencer and A. Zwicky (eds.), *The Handbook of Morphology*. Oxford: Blackwell Publishers, pp. 283-305.
- MOLINA, FELIPE S., HERMINIA VALENZUELA, AND DAVID LEEDOM SHAUL. 1999. *Yoeme/English-English/Yoeme Standard Dictionary*. New York: Hippocrene Books.
- MORAVCSIK, EDITH. 1978. Reduplicative constructions. In *Universals of Human Language* vol. 3: Word Structure, ed. Joseph H. Greenberg, 297-334. Stanford, CA: Stanford University Press.
- SHAW, PATRICIA A. 2005. Non-adjacency in reduplication. In *Studies on Reduplication*, ed. B. Hurch. Berlin: Mouton de Gruyter, pp. 161-210.

¹ This paper follows most of the traditional practical orthography used in transcribing Arizona Hiaki words, with the exception that the two diagraphs *ch* and *bw* are here transcribed with a character indicating that these sounds involve a single segment. I will use *č* to indicate the post-alveolar affricate and *b^w* to indicate the labio-velarized voiced bilabial stop, respectively. The glottal stop is indicated with an apostrophe ('); orthographically vowel-initial words actually contain a glottal stop onset which is usually not written, although I indicate the word-initial glottal stop here in certain crucial places. Other consonantal characters are pronounced more or less in accordance with their English counterparts, with the vowels having the predictable quality of their Spanish counterparts.

² Escalante (1985) also regards Hiaki reduplication as being sensitive to syllable structure, going so far as to use (non-gemination-inducing) syllable reduplication as a DIAGNOSTIC for syllable boundaries in non-reduplicated words (pp. 10-12). Because of important exceptions to this generalization, which will be discussed in detail below, this view is probably too strong. However, it remains important to note because it demonstrates the intuition of one native speaker linguist, i.e. the late Fernando Escalante, that Hiaki targets PROSODIC constituents (syllables), and not morphological constituents, for reduplication.

³ It is important to note at this point that the language does not have any particular coda restrictions: any consonant of the language may serve as a coda, as is seen in the RED_{S+G} cases of reduplication where any consonant can form a geminate between the leftmost onset of the stem and the coda of the reduplicant: e.g. *kik-ki.mu* 'enter', and many other examples. Some researchers, e.g. Frampton (2009), have proposed constraints such as "Onset Permanence" to prevent phonological operations from "recruiting onsets for other syllabic roles" (p. 108), in

order to account for the CV/CVC syllable reduplication distinction in Hiaki. The gemination in RED_{S+G} reduplication in Hiaki shows us that onsets CAN be recruited to create a coda at the juncture between reduplicants and their bases, but that they CANNOT be recruited from the SECOND syllable of the base to create a coda for the reduplicant (i.e. **kim-ki.mu*).

⁴ Many examples of such forms are illustrated in H&L 2009, pp. 241-2 (figure 5) and pp. 244-5 (figure 8).

⁵ Recall also that some Hiaki disyllabic verb stems with word-internal –k- may also be monomoraic if that consonant is a thematic suffix (cf. examples like 2.2c, and others in H&L 2009’s figure 5 on pp. 244-5), as is assumed by H&L for trisyllabic words where –k- closes the second syllable and fails to reduplicate; in this latter case disyllabic reduplication typically occurs, and H&L regard this pattern as the full reduplication of a disyllabic root. We do not yet have firm criteria for unambiguously identifying roots as such for Hiaki, so this ambiguity of analysis remains for H&L’s root-based account of reduplication. No such ambiguity exists for the prosodically-based syllabic account which only identifies the syllabic structure of the stem (i.e. whether the first syllable is composed of a CV or CVC).

⁶ Hiaki accent is notoriously difficult to analyze, and it is thus usually not marked in transcriptions. The examples marked for accent here come from Demers, Escalante, and Jelinek (1999), who utilized careful acoustic analysis to identify the characteristics of accent in the language. The placement of accent does not play a large role beyond the present discussion, and it is therefore not marked in the examples above or below, as per usual practice.

⁷ An important additional note about the interaction of Hiaki accent with reduplication is that the lexical placement of the accent (i.e. on the first or second mora) does not play a role in

determining which of the reduplicative allomorphs a given verb root will take. Thus, examples can be found where verbs with similar structure and accent placement take different reduplication patterns, and verbs with different accent placement can take the same reduplication pattern. An example of the latter case are minimal pairs such as *káate* ‘build a house’ and *kaáte* ‘walk (PL)’, which both take a syllabic reduplicant: *ká-kate* and *ka-káate*, respectively. Demers et al. 1999 argue that the verb stems themselves behave differently under reduplication, with vowel-shortening applying to the verb stem in the former case but not the latter. H&L, though, provide the opposite characterization of the data. In either case it should be clear that syllabic reduplication can occur with verb stems of EITHER verb class, as can the other patterns of reduplication in the language.

This is a major reason why lexical specification must be invoked to account for Hiaki reduplicative allomorphy.

⁸ The expected gemination for the postalveolar affricate involves a lengthening of the plosive portion of the geminate only, cf. examples like *hičike* > *hitčike* [hittʃike], rather than a full doubling of both the stop and fricative portions of the affricate, cf. **hiččike* **[hitʃtʃike]* (cf. Harley & Leyva 2009: 248, n.28).

⁹ RED_{S+G} reduplication, which results in the gemination of the initial onset of the stem into the coda of the reduplicant, necessitates a slight refinement of this generalization—it is specifically the onset consonant OF THE SECOND SYLLABLE of the stem that is prohibited from copying as a coda in Hiaki syllabic reduplication.

¹⁰ Relative paucity of a given linguistic pattern is an orthogonal issue to its existence—i.e. the question *Why is linguistic pattern X so rare?* is interesting but fundamentally different

than *Does linguistic pattern X exist?* (Further, of course, the former presupposes an affirmative answer to the additional question, *Is linguistic pattern X rare?*).

¹¹ There is an alternative characterization of the Mayo reduplication facts that would also lead to a unification of the two classes but which would still allow for a syllable-based definition of the reduplicative base in the accented class. This would be to simply state that the base for reduplication is demarcated at the right edge of the accented syllable in the unreduplicated form. Thus, the base is the second syllable in the unaccented class, but it is the first syllable in the accented class. See Haugen (2004) for an account of Mayo reduplication along these lines.

¹² In Shaw's theory the base is defined by means of a standard anchor constraint, where the reduplicative morpheme is anchored to some constituent of a wordform, either morphological (root, stem, etc.) or prosodic (foot, syllable, etc.). The reduplicant is evaluated for faithfulness to that base via base-reduplicant correspondence constraints, in a manner similar to the way that phonological outputs are evaluated for correspondence to their inputs.

¹³ An alternative analysis might employ an output constraint such as STRUCTURAL ROLE (STRUCROLE) to mitigate against onset consonants from a base serving as coda consonants in a reduplicant. Such an account would not be able to account for Hiaki heavy-syllable, geminating (RED_{S+G}) reduplication, however, since such a constraint would be violated in these cases as well. As emphasized above, the leftmost onset of the stem CAN serve as the coda of the reduplicant, but onsets to the second syllable cannot. The account which proposes base-delimitation directed at the edge of the first syllable works for both classes (CV/CVC and RED_{S+G}) of syllable reduplicant in Hiaki. It also ably accounts for reduplication in the Mayo accented word class, where the reduplication process uniquely cannot apply beyond the domain

for the assignment of lexical accent in the unduplicated form (i.e. the first syllable) in that language.

¹⁴ This implementation in Frampton's DR is slightly different from Shaw's Base Constituent Hypothesis in BRCT. For Frampton, prosodic constituents may be targets for reduplication just like morphological constituents, *iff* the prosodic constituent is (or potentially can also be) a morphological constituent. This is a much more strictly defined notion of potential prosodic targets for reduplication than what is proposed by Shaw.