

Aslian Reduplication as the Emergence of the Unmarked*

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1. Introduction

The present study is concerned with “the emergence of the unmarked” in language, in the sense that the independently-motivated canonical structure of a language is utilized for a new function and makes its appearance. This sense of the emergence of the unmarked is different from, if not unrelated to, the technical and narrower sense of the term in Optimality Theory, which is also discussed in detail. This article deals primarily with the emergence of unmarked prosody in reduplication, focusing particularly on prosody and reduplication in Temiar and Semai, which are Aslian (and Mon-Khmer) languages spoken in the Malay peninsula.¹⁾

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1) “Aslian” and “Mon-Khmer” are (sub)families of the Austroasiatic languages, but there is no consensus on their classification and naming: some researchers take them as separate groups, whereas others use the term “Aslian” to refer to a subgroup of Mon-Khmer (cf. Ruhlen 1987: section 4.5). The arguments to be made later do not hinge on this (sub)grouping, but this article adopts the term “Aslian” to refer to the language group that Temiar and Semai belong to, because they have a few different characteristics from the typical Mon-Khmer languages in terms of both phonology and morphology (I owe this observation to an anonymous reviewer).

They have apparently unusual types of reduplication in terms of the base-reduplicant association pattern and the reduplicant's prosodic form. The article argues that they can nevertheless be explained as instances of the emergence of the unmarked in the sense stated above, characterizing the notion of (un)markedness in terms of "system-(in)dependency".

Temiar and Semai have several types of reduplication, which can be categorized into the following five types:^{2,3)}

(1) Five types of reduplication in Temiar and Semai:

a. Type 1: C_1C_f prefixation to the heavy syllable of the base

Base: a biconsonantal root

Meaning: active voice and continuative aspect

$C_1V(:)C_f \rightarrow C_1C_f.C_1V(:)C_f$ ⁴⁾

- | | | | |
|---------|------|---|----------------------|
| Temiar: | i. | $k\alpha:w \rightarrow \mathbf{k}w.k\alpha:w$ | ‘to be calling’ |
| | ii. | $ca:ʔ \rightarrow \mathbf{c}ʔ.ca:ʔ$ | ‘to be eating’ |
| | iii. | $lug \rightarrow \mathbf{l}g.lug$ | ‘to be laughing’ |
| Semai: | iv. | $koh \rightarrow \mathbf{k}h.koh$ | ‘to be chopping off’ |
| | v. | $ci:p \rightarrow \mathbf{c}p.ci:p$ | ‘to be walking’ |
| | vi. | $ku:ʔ \rightarrow \mathbf{k}ʔ.ku:ʔ$ | ‘to be vomiting’ |

2) The following data of Temiar and Semai are taken from Benjamin (1976) and Diffloth (1976a, b). There are several other previous studies that deal with Aslian/Mon-Khmer reduplication (McCarthy 1982; Svantesson 1983; Broselow and McCarthy 1983; Sloan 1988; Shaw 1993, 1996; Takeda 1997; Gafos 1998; Hendricks 2001). See Miyakoshi (2005a) for their review.

3) This article adopts a strictly phonological orthography and does not write arguably epenthesized vowels for several reasons to be presented later (see section 3 for discussion). Many previous studies on the Aslian/Mon-Khmer languages also adopt the phonological notation (see the references cited just above).

4) The base is represented to the left of the arrow, and the reduplicated form to the right. C_1 and C_f stand for the first and final consonants of the base, respectively. The reduplicant is highlighted by boldface.

- b. Type 2: C_f infixation immediately to the left of the heavy syllable of the base

Base: a bi-/tri-consonantal root (and the causative affix *r/tr*)⁵⁾

Meaning: active (causative) voice and continuative aspect

$C_1(r/tr).CV(:)C_f \rightarrow C_1(.r/t.r)C_f.CV(:)C_f$

- Temiar: i. s.lɔg → **sg**.lɔg ‘to be lying down’
 ii. sr.lɔg → s.**rg**.lɔg ‘to be laying down’
 iii. tr.kɔ:w → t.**rw**.kɔ:w ‘to be calling’
 Semai: iv. c.ʔu:l → **cl**.ʔu:l ‘to be choking’
 v. b.he:ʔ → **bʔ**.he:ʔ ‘to be being satisfied’
 vi. c.ləh → **ch**.ləh ‘to be going down’

- c. Type 3: C_1 prefixation with the fixed vowel *a* to the heavy syllable of the base

Base: a biconsonantal root

Meaning: i. active voice and simulfactive aspect

ii. resultatives

$C_1V(:)C_f \rightarrow C_1a.C_1V(:)C_f$

- Temiar: i. kɔ:w → **ka**.kɔ:w ‘to call’
 Semai: ii. rɔc → **ra**.rɔc ‘to be uprooted (of a tuber)’
 iii. cē:s → **ca**.cē:s ‘to be torn off’

- d. Type 4: C_1C_f prefixation to the stem base

Base: a polysyllabic stem

Meaning: “expressive” (prolongation or continuous repetition in time)⁶⁾

5) The two forms (*r* and *tr*) are the allomorphs of the causative affix.

6) The notion of “expressive” is hard to define. Benjamin (1976) describes it as follows: “Semantically, they [expressives] serve as a kind of expressive mirror-phrase, summing up in a word or two the ‘feelings’ that are stereotypically supposed to be aroused in the interlocutors’ minds. It is extremely difficult to find satisfactory translation labels for these forms because, even though they are standardized phrases, they are concerned more with connotational than with denotational meanings. They are very common in ordinary conversation, and in stories and song-lyrics they are an essential element of the style.” (p. 177) Diffloth (1976b: 251–52) claims that expressive reduplication morphemes connote

$$C_1(.CC).CV(:)C_f \rightarrow C_1C_f.C_1(.CC).CV(:)C_f$$

- Temiar: i. b.guy → **by**.b.guy ‘to waft (smoke)’
 ii. r.we:g → **rg**.r.we:g ‘to stand conspicuously upright’
 iii. k.rd.lā:d → **kd**.k.rd.lā:d ‘curly hair’
- Semai: iv. d.ŋoh → **dh**.d.ŋoh ‘appearance of nodding constantly’
 v. g.hup → **gp**.g.hup ‘irritation on skin’
 vi. b.ʔəl → **bl**.b.ʔəl ‘painful embarrassment’

e. Type 5: CV(:)C_f suffixation to the stem base⁷⁾

Base: a polysyllabic stem

Meaning: “expressive” (repetition at intervals of time)

$$C_1(.CV).CV(:)C_f \rightarrow C_1(.CV).CV(:)C_f.CV(:)C_f$$

- Temiar: i. k.ra.hab → k.ra.hab.**hab** ‘lip-smacking’
 ii. k.ra.ləg → k.ra.ləg.**ləg** ‘sound of heavy footsteps’
 iii. c.ra.ʔu:k → c.ra.ʔu:k.**ʔu:k** ‘stomach queaziness’
- Semai: iv. d.yō:l → d.yō:l.**yō:l** ‘the appearance of an object floating down a river and getting stuck here and there’
 v. k.na.rā:c → k.na.rā:c.**rā:c** ‘repeated pains of deep wound’
 vi. g.ra.yul → g.ra.yul.**yul** ‘several people shaking something repeatedly’

As indicated earlier (footnote 3), these words are not phonetically realized as such. A short vowel is epenthesized between two consecutive consonants. In Temiar, the short mid vowel *ɛ* is used in closed syllables, and the schwa *ə* in open syllables. For example, (1ai) and (1di) are phonetically realized as *kɛwkɛ:w* and *bɛybəguy*, respectively. What should be noted here is that, a few exceptions aside, these vowels consistently appear in the environments specified just above. They are therefore likely to be epenthesized by a general phonetic process to break up a consonan-

“prolongation or continuous repetition in time” or “repetition at intervals of time”.

7) It is not very clear whether the heavy syllable reduplicant is suffixed or infix, but I tentatively assume that it is a suffix for a few reasons (see section 3 for discussion).

tal cluster.⁸⁾ If they were lexically specified one by one, then it would be difficult to explain their consistency in terms of both segmental quality and prosodic condition.

Another possibility that should be rejected is that the segments of the base are first copied completely and then a marked vowel is replaced by an unmarked one to minimize segmental markedness violations. If we took this markedness approach, then we would fail to capture the generalization that holds across reduplicative morphemes like the above and non-reduplicative ones like the following, where *s.luh* is a verb root and *n* is the infix for nominalization:

- (2) a. *s.luh* [səluh] ‘to shoot’
 b. *sn.luh* [senluh] ‘shooting’

Notice that *ɛ* and *ə* consistently appear in the designated environments, *whether or not they are created by reduplication*, and that the copy-and-replacement approach can only accommodate reduplicated forms. The phonetic epenthesis approach, on the other hand, can handle both reduplicative and non-reduplicative morphemes *uniformly*.⁹⁾

If this phonetic epenthesis hypothesis is true, then it turns out that some types of Aslian reduplication are somewhat unusual in terms of both the base-reduplicant (B-R) association pattern and the reduplicant’s prosodic form. Crosslinguistically, the common type is that the reduplicant corresponds to a contiguous (sub)string of the base and takes the form of an “authentic unit of prosody” like a foot/syllable/mora (see Rubino 2005 for a typological survey). For example, the reduplicated forms in (3) and (4) illustrate a few common types of reduplication, where the reduplicant

8) Semai is not so consistent as Temiar in terms of vowel epenthesis. For example, *a* is inserted before *h* and *ʔ*, and thus the phonetic realization of (1aiv) is *kahkoh*.

9) Moreover, it will be shown later that the problem of copying the vowel in the base should be attributed to the prosodic markedness of a reduplicated form as a whole rather than to the segmental markedness of the vowel itself (see section 3).

is a syllable with a vowel nucleus or a disyllabic foot:

- (3) Partial Reduplication:
- a. CV Reduplication in Nootka:
 č̣i-č̣ims-‘i:h ‘hunting bear’ (Stonham 1994)
 - b. CVC Reduplication in Lushootseed:
 cas-cast ‘branches’ (Hess 1966)
 - c. CVCV Reduplication in Boumaa Fijian:
 buta-butawo ‘steal on a number of occasions’ (Dixon 1988)
- (4) Total Reduplication:
- a. CVC Reduplication in Palan Koryak
 liŋ-liŋ ‘heart’ (Spencer 1991)
 - b. CCV Reduplication in Dakota
 ksa-ksa ‘to cut’ (Broselow and McCarthy 1983)
 - c. CVCV Reduplication in Japanese:
 yama-yama ‘a range of mountains’

There are many other languages with reduplication of similar types (cf. Miyakoshi 2005a and the references cited therein). In contrast, some types of Aslian reduplication produce an apparently non-authentic unit of prosody, and it does not correspond to a contiguous substrings of the base. For example, consider the first (prefixed) type of reduplication in (1a). The reduplicant of this type consists only of copies of the first and last consonants of the base; e.g., the first consonant *k* of the reduplicant *kh* in the word *kh.koh* corresponds to the first consonant of the base *koh*, and the last consonant *h* of the reduplicant to the last consonant of the base. Moreover, this reduplicant appears prosodically defective in that it has no vowel or sonorant consonant on which a basic syllable could be erected. The second (infixal) and fourth (stem-prefixal) types of reduplication also appear unusual in terms of the B-R correspondence and the resulting prosodic structure, although the third (prefixed with *a*) and the fifth (arguably suffixal) are familiar types of reduplication that are attested in many other languages.

The present study thus addresses the following questions, focusing primarily on the apparently unusual types of reduplication in the Aslian languages:

- (5) a. Why is it that Aslian reduplication takes the form that it does? (In the case of Type 1, for example, why is it prefixal, and why not, say, suffixal? Why is it that only the first and last consonants are reduplicated, and why not other segments?)
- b. Why is it that Temiar and Semai have such apparently unusual types of reduplication, whereas many other languages (say, English and Japanese) do not?

In answer to these questions, this article makes the following three claims. First, the apparently unusual types of Aslian reduplication, in fact, fall within the range of the regular prosody of the language, and even reflect its canonical prosodic structure. It turns out, therefore, that Aslian reduplication can be described as an instance of the emergence of the unmarked in the particular sense stated above: the independently-motivated, canonical prosodic structure of a language is recycled for a new function and reveals itself as a reduplicated form.

Second, the unmarked prosodic structure of Temiar and Semai is the so-called “sesquisyllabic” structure with final prominence, which is a disyllabic iamb with a “minor syllable” (a syllable with no vocalic nucleus): $[(C(C)-C\acute{V}C)_{Fl}]_{PrWd}$. I take it as the canonical iamb on several grounds to be presented later, and suggest that this unmarked prosodic structure is motivated by a general constraint on rhythmic grouping:

- (6) Iambic/Trochaic Law:
 - a. Elements contrasting in intensity naturally form groupings with initial prominence.
 - b. Elements contrasting in duration naturally form groupings with final prominence.

(Hayes 1995: 80)

This is a “domain-general” and “system-independent” constraint—“domain-general” in the sense that it pertains to human perceptual preference and applies to non-linguistic rhythmic grouping (e.g. music) as well as to phonological structure; “system-independent” in the sense that it gives preference to one structure over another, *independently of the state of a system to which they belong*. Under this system-independent characterization of (un)markedness, for example, the canonical iamb (LH) is regarded as being less marked than an iamb with even duration like (LL) *in any language*.

Third, the notion of “(un)markedness” needs to be characterized system-dependently as well as system-independently. If it is only characterized in system-independent terms, then emergence-of-the-unmarked phenomena would be invariant across languages; for example, it could even be the case that the sesquisyllabic structure emerges as a reduplicated form in all the languages with reduplication. The fact is that languages often vary with respect to the prosodic structure that emerges as a reduplicated form. This suggests that what structure is unmarked may vary from language to language, and what structure emerges as the unmarked may accordingly differ depending on the language system. As will be shown in section 3, the sesquisyllabic structure is unmarked in the Aslian languages, but not in many others. It is therefore likely to emerge as a reduplicated form in languages like Temiar and Semai which have many words of that form, independently of reduplication. On the other hand, it is not likely to emerge in languages like English and Japanese which do not have any words of that form. Linguistic theory should capture the emergence of the unmarked in this sense.

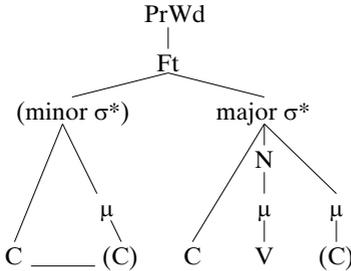
The article is organized as follows. Section 2 describes the regular prosodic structures of Temiar and Semai, spelling out their characteristic properties. Based on the descriptive generalizations, section 3 (the main body of the article) develops an OT analysis of Aslian prosody and reduplication, giving answers to the specific questions posed earlier. Section 4 summarizes the main claims, and raises a few general questions about the

emergence of the unmarked as directions for future research.

2. The Regular Prosody of Temiar and Semai: Descriptive Generalizations

This section describes the regular prosodic structures of Temiar and Semai, specifying the range of their canonical and legitimate prosodic structures. I assume with Shaw (1993, 1996) that they have the following prosodic structures:

(7) Legitimate prosodic structures of Temiar and Semai:¹⁰⁾



The “major syllable” is defined as one with a nuclear mora, and the “minor syllable” is one without it. Let us see in turn (i) the status and internal structure of the major syllable, (ii) those of the minor syllable, and (iii) their relationship.

The major syllable has at least five properties. First of all, it is obligatory in the sense that it is required for a word to stand: there are no words without a major syllable in the Aslian languages. Second, an onset is obligatory: no major syllables without an onset are permitted. Third, a coda is basically optional, but is required in the word-final position. Fourth, complex margins are prohibited. Finally, stress always falls on the

10) The parentheses indicate optionality, the Kleene stars repeatability, and the underline an epenthesis position. Thus, the diagram in (7) is meant to represent several types of prosodic structures including sesquisyllabic ones, rather than just a single structure. It is assumed on grounds to be presented below that the coda is moraic whereas the epenthesized vowel is not.

word-final (heavy) syllable, a property that plays an important role in the analysis of Aslian reduplication to be presented in the next section. Thus, the following structures are all legitimate in Temiar and Semai, independently of reduplication:

(8) CVC words:

a. Temiar:

- i. jiʔ 'sick'
- ii. tɛʔ 'earth'
- iii. doʔ 'to run'
- iv. tab 'egg'
- v. tuh 'to tell'

b. Semai:

- i. dər 'flame'
- ii. dic 'completed'
- iii. koh 'to chop off'
- iv. pɛc 'to throw, shoot'
- v. dəp 'to settle on a place off the ground'

(9) CV:C words:

a. Temiar:

- i. tu:k 'to fear'
- ii. tɛ:ʔ 'just now'
- iii. bə:h 'father'
- iv. de:k 'house'
- v. gə:b 'completely'

b. Semai:

- i. ŋa:r 'to face'
- ii. du:y 'evening'
- iii. bi:t 'to squint'
- iv. gʊ:y 'to sit'
- v. ŋʌ:c 'burnt'

(10) CV.CV(:)C words:

a. Temiar:

- i. ha.lab 'to go down river'
- ii. bo.ləh 'can'
- iii. ma.doh 'to here'
- iv. ʔi.ci:b 'I go'
- v. do.rɛ:h 'downwards'

b. Semai:

- i. ga.ra:c 'to slide'
- ii. ja.lec 'small plant'
- iii. pa.gec 'to sharpen a tool roughly/quickly'
- iv. sa.gɔc 'to pry (e.g. a log) open halfway'
- v. sa.lic 'to occupy, take over a place'

(11) CVC.CV(:)C words:¹¹⁾

a. Temiar:

- i. sin.dul 'to float'
- ii. num.naʔ 'from there'
- iii. diŋ.yɛ:w 'guard house'
- iv. hum.bo:ʔ 'normally'
- v. ʔun.tu:y 'they elsewhere'

b. Semai:

- i. kan.rɔŋ 'protruding muscles of thin person'
- ii. raŋ.kəŋ 'skeletal'
- iii. raŋ.gɔ:c 'bare-necked (as of chicken)'
- iv. run.tuc 'to snatch'

The minor syllable has some characteristic properties, which make

11) The first syllables in these examples happen to be all CVN (nasal), but it is not clear from the available data whether this is just an accident or not (see (20) for similar examples). If the nasal turns out to be non-moraic, then it follows that the examples in (11), like those in (10), represent a light-heavy syllable sequence, which is a prosodically natural consequence (see section 3.1 for discussion of this matter). Further investigations need to be made to decide the moraic status of the nasal coda. I leave this problem for future research.

the Aslian prosodic structures apparently unusual. First of all, it is “parasitic” in the sense that it cannot stand alone and requires a major syllable to constitute a word. There are no words that consist only of a minor syllable/syllables in the Aslian languages. Second, as indicated earlier, the minor syllable is phonetically realized with a vowel, but its segmental quality is predictable from the prosodic environment around it. It is therefore likely that the vowel is not lexically specified but is rather epenthesized by phonetic processes. Consider the following pair of Temiar words for example:

- (12) a. *s.ləg* [sələg] ‘to lie down’
 (root/active voice, perfective aspect)
 b. *sg.ləg* [səgləg] ‘to be lying down’
 (active voice, continuative aspect)

The perfective form *s.ləg* is phonetically realized as *sələg*, but the continuative form as *səgləg*. If the short mid vowels *ə* and *ɛ* were used only for these words, then one would assume that they are lexically specified. However, a few exceptions aside (recall footnote 8), they consistently appear in the same environment: *ə* in the open syllable, and *ɛ* in the closed syllable. Consider the following pairs of words, where *n* is the infix for nominalization:

- (13) a. *sg.ləg* [səgləg] ‘to knot’
 b. *s.ng.ləg* [sənɛgləg] ‘knot’
 (14) a. *cer* [cɛr] ‘to pare’
 b. *c.nɛr* [cənɛr] ‘knife’
 (15) a. *s.luh* [səluh] ‘to shoot’
 b. *sn.luh* [sɛnluh] ‘shooting’
 (16) a. *go.lap* [golap] ‘to carry on shoulder’
 b. *g.no.lap* [gənolap] ‘carrying on shoulder’
 (17) a. *sin.dul* [sɪndul] ‘to float’
 b. *s.nin.dul* [sɛnɪndul] ‘floating’

The Temiar verb *sgl̥əg* ‘to knot’ in (13) is phonetically realized in the same way as the continuative form of the verb cited just above, which is similar to it prosodically and segmentally. If it is nominalized by the infixation of *n* in the second position and the resulting form is syllabified from right to left, then it is realized as *sənegl̥əg*, as predicted by the above epenthesis hypothesis. This analysis can successfully apply to other types of roots, whether they are biconsonantal (14), triconsonantal with a minor syllable (15), triconsonantal with no minor syllable (16), or quadriconsonantal (17).

The internal structure of the minor syllable is almost the same as that of the major syllable, except for the absence of a nuclear vowel. An onset is obligatory, but a coda optional. If it appears, then it is moraic. No complex margins are permitted. Thus, the structure of the minor syllable is always C_ or C_C, where the underlines indicate epenthesis positions. The epenthésized vowel is arguably not moraic, which will be discussed in the next section. Minor syllables, again like major syllables, can be concatenated with each other. Stress never falls on any minor syllables. This is presumably the reason for Thomas’s (1992) observation that the syllabic status of the minor syllable is sometimes unclear in poetry, chanting, and singing (thus words with a minor syllable are sometimes counted as one syllable, sometimes two); hence the name “sesquisyllabic”.¹²⁾ Due to these properties of the minor syllable, the following sesquisyllabic structures with stress on the final syllable are all permitted in Temiar and Semai, *independently of reduplication*:

12) This is one of the grounds for assuming that the epenthésized vowel is not moraic. See the next section for discussion of this matter.

(18) C.CV(:)C words:

- a. Temiar:
- i. s.ləg 'to lie down'
 - ii. s.luh 'to shoot'
 - iii. c.nɛr 'knife'
 - iv. r.wa:y 'head-soul'
 - v. k.ro:p 'underside'
- b. Semai:
- i. m.mat 'shrub'
 - ii. p.le:ʔ 'fruit'
 - iii. s.tit 'sling'
 - iv. c.ŋa:l 'red'
 - v. c.ʔe:t 'sweet'

(19) CC.CV(:)C words:

- a. Temiar:
- i. sg.ləg 'to knot'
 - ii. sn.luh 'shooting'
 - iii. br.ca:ʔ 'to feed'
 - iv. kr.wa:k 'to frame'
 - v. gr.lət 'long and thin'
- b. Semai:
- i. kr.lɛc 'to extract the pit of a fruit'
 - ii. sn.ʔɔ:y 'human being'
 - iii. mr.hũ:r 'snake'
 - iv. gr.par 'mountain imperial pigeon'
 - v. gr.pər 'small bat'

(20) C(C).CC/V.CV(:)C words:¹³⁾

- a. Temiar:
 - i. k.rn.wa:k ‘frame’
 - ii. t.rn.ʔɔj ‘raising’
 - iii. s.ng.ləg ‘knot’
 - iv. gn.gr.lut ‘spindliness’
 - v. g.no.lap ‘carrying on shoulder’
- b. Semai:
 - i. b.rk.ye:k ‘several white things’
 - ii. k.lc.wēc ‘irregular flapping circular movements’
 - iii. r.rɲ.ʔaɲ ‘appearance of irregular cracks’
 - iv. k.nm.ji:p ‘feelings’
 - v. k.la.tā:p ‘the appearance of a swollen ant-bite’

Finally, what should be noted about the relation between the major and minor syllables is that the minor syllable always precedes the major syllable within a prosodic word. Therefore, prosodic word structures like the following are all prohibited:

- (21) Some illegitimate prosodic word structures in Temiar and Semai:
 - a. * CVC.C
 - b. * CVC.CC
 - c. * C.CVC.C

The particularly important properties of Temiar and Semai prosodic structures are summarized as follows:

- (22) Characteristic properties of Temiar and Semai prosodic structures:
 - a. An onset is obligatory.
 - b. No complex margins are permitted.

13) Here again, many of these words have a syllable with a nasal coda in a non-final position. We might need to address a question about the moraic status of a nasal coda in the minor as well as the major syllable (recall footnote 11).

- c. A coda is optional in word-initial/internal positions, but is obligatory in the word-final position.
- d. Stress falls on the word-final syllable.
- e. The sesquisyllabic structure with a minor syllable is permitted.
- f. Minor and major syllables can be concatenated with each other.
- g. The minor syllable always precedes the major syllable within a prosodic word.

Based on these descriptive generalizations, the next section will develop an OT account of Aslian prosody and reduplication.

3. The Analysis

This section first presents an OT analysis of the regular prosody of Temiar and Semai, suggesting a few constraints that motivate their unmarked prosodic structures (section 3.1). It then provides an OT account of their reduplication, giving answers to the main questions posed earlier (section 3.2).

3.1 Temiar and Semai Prosody

Let us first consider how the characteristic properties of Temiar and Semai prosodic structures in (22) are described in OT terms. First of all, assuming that Onset and *Complex are both ranked at the top of the hierarchy, we can account for the observations in (22a) and (22b):

- (23) Onset: The syllable must have an onset.
- (24) *Complex: No more than one segment may link to any syllable margin position.

The observation about a coda in (22c) can be accommodated by ranking Final-C at the top and No-Coda lower than it:

- (25) Final-C: The word-final syllable must have a coda consonant.
- (26) No-Coda: The syllable may not have a coda.

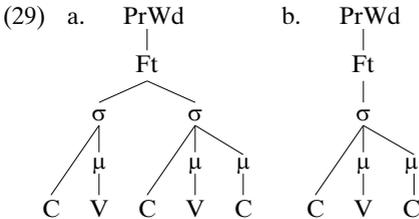
No-Coda favors open syllables, but a closed syllable is required in the word-final position by the more specific and higher-ranking constraint: Final-C.

The basic stress pattern in (22d) is captured by Iambic and Align-Ft (Ft, R, PrWd, R):

(27) Iambic: The foot must be iambic with the form (L \acute{H}) or (\acute{H}).

(28) Align-Ft (Ft, R, PrWd, R): The right edge of every foot must be aligned with the right edge of a prosodic word.

Ranking these constraints at the top of the hierarchy ensures that a prosodic word always has only one foot at the right edge of it, and that the foot takes the shape (L \acute{H}) or (\acute{H}). Given this ranking, together with the assumption that codas are moraic, we can predict that the following prosodic structures are legitimate in Temiar and Semai:



This is borne out by the existence of words with an iambic foot like (8)–(10). Note that such words could not be described in usual prosodic terms (i.e., as prosodic words with an iambic foot), *if* codas were not moraic. The consistent stress pattern in Temiar and Semai can thus be taken as a piece of evidence suggesting that they *are* moraic.

What about sesquisyllabic structures with a minor syllable? How can we account for the observation in (22e)? One of the crucial constraints is the following:

(30) No Unstressed V-Place (NUVP): Vocalic features must be in a stressed position.

(Spaelti 1997: 53)

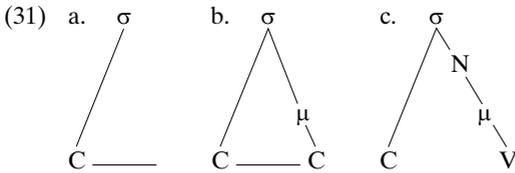
I assume with Spaelti (1997) that the loss of vowels (or vocalic distinctions) in the unstressed reduplicant is the effect of this constraint. This constraint is not stipulated only for reduplicated forms. Rather, it has broader effects. For instance, it accounts for the well-known observation that vocalic contrasts are often reduced in unstressed positions; e.g., seven vowels are reduced to five in Italian (Vincent 1987), seven to three in Catalan (Mascaró 1978), five to three in Russian (Jones and Ward 1969).¹⁴⁾ It also accommodates similar vowel reduction phenomena (particularly reduction to schwa) that have been observed in many other languages (cf. Selkirk 1977 for French; Hayes 1980/1985 for English and Eastern Chermis; Cohn 1989 for Indonesian; Kager 1990 for Dutch; Urbanczyk 1995 for Lushootseed; Hayes 1995 for Macushi, Choctaw, Chickasaw, Ossetic, Cambodian, Araucanian, and Cayuga; see Crosswhite 2001 for a comprehensive study of vowel reduction). That is, NUVP is responsible not only for the existence of minor syllables in Temiar and Semai, but also for the behavior of vowels widely attested in stress-based languages in general.

Given the communicative function of segments (morpheme distinctions) and the speaker's propensity for seeking articulatory economy, the above stress-sensitive behavior of vowels makes sense. The vowels in stressed positions, being prominent, are likely to serve the communicative function better than those in stressless positions do. Therefore, the segmental contrasts in the former environment tend to be retained. On the other hand, those in the latter bear less communicative burdens, and are thus more likely subject to reductions under the pressure of economy. Consequently, the constraint in (30) might not have to be stipulated as such. It might rather be explained as the effect of the interaction of the well-known inherently antinomic constraints: (i) the speaker-oriented constraint requiring that articulatory efforts be minimized, and (ii) the hearer-oriented constraint requiring that perceptual distinctions be maxi-

14) Tonal contrasts are also reduced in unstressed positions (cf. Yip 1980/1990 for Mandarin).

mized for communicative purposes (cf. Zipf 1949: 21; Martinet 1960/1964: 167–68, 1962: 139; Carroll and Tanenhaus 1975: 51; Horn 1984: 11, Haiman 1983: 814, Haiman 1985; Du Bois 1985: 358; Krug 2001: 312–14).

Getting back to the descriptive level, let us consider how minor syllables are represented at the phonological level. I assume, following Shaw (1993, 1996), that they have the prosodic structures in (31a, b), as opposed to the ordinary one in (31c), which is the structure that the major (open) syllable takes:



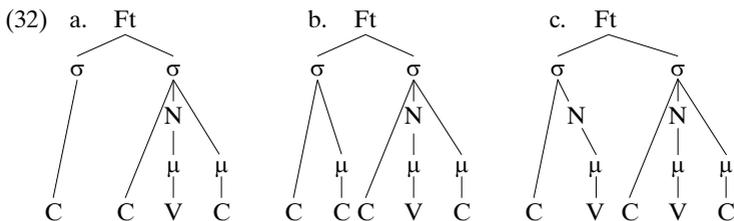
The crucial difference between the two minor syllables is that the one with a coda in (b) is moraic, whereas the one with no coda in (a) is non-moraic. As indicated earlier, the stress pattern in the Aslian languages evidences the moraic status of codas. This reasoning in turn leads us to the conclusion that the epenthetic vowel in the minor syllable is not moraic. If it were, then it would follow that minor syllables with a coda (CC) are heavy and do not constitute an iambic foot with a major heavy syllable (CVC)—an unwelcome consequence.

Furthermore, as will be shown shortly, the sesquisyllabic structure CC-CVC is the canonical iambic foot motivated by a domain-general constraint on rhythmic grouping, and the absence/reduction of a vowel in the first syllable (i.e., the very existence of the minor syllable) is explained as a consequence of its being in the disyllabic iamb. That is, its form is motivated by its position in a particular foot (and by a domain-general constraint), which suggests that the minor syllable with a coda (C_C) is light, and in turn that the epenthetic vowel is not moraic.¹⁵⁾ This reason-

15) Note that this analysis implies that the minor syllable with no coda (C_), being non-moraic, is lighter than the minor syllable with a coda. Based on this

ing is consistent with Piggott's (1995) observation of epenthetic vowels in Mohawk, Iraq Arabic, Selayarese, and Yapese. It shows that certain epenthetic syllables in these languages behave as weightless syllables with respect to some weight-sensitive phenomena like stress assignment, vowel lengthening, and the bimoraicity of the minimal word.

The critical difference between the major and minor syllables is the presence/absence of a nuclear mora. The major syllable in (31c) has a nuclear mora with a vowel, whereas the minor syllables in (31a) and (31b) do not. I take these three syllables as light syllables with different degrees in weight, calling the lightest one in (a) "a non-moraic syllable", the heavier one in (b) "a non-nuclear-moraic syllable", and the even heavier (but still light) one in (c) "a nuclear-moraic (light) syllable". This three-way distinction of light syllables allows us to distinguish the following three kinds of disyllabic feet from one another in terms of weight, thereby opening up a way toward a new dimension of foot hierarchy (cf. Prince 1990):



These are all acceptable in Temiar and Semai, which is confirmed by (18), (19) and (10).

Recall here that they have another legitimate foot structure in (29b), and that it, unlike the ones in (32), is monosyllabic. Of these four types of foot structures, I assume that the sesquisyllabic ones in (32a, b) are the unmarked prosodic structures in Temiar and Semai. Postponing further

distinction between the two minor syllables and on the distinction between the minor and major syllables, I shall shortly categorize light syllables into three types.

discussion until the next section, I here define “unmarked structures” tentatively as ones that have one or more system-independent motivations, which include motivations from language-external systems like perception and motor control. In the case at hand, I assume that the following system-independent and domain-general constraint plays a crucial role:

(33) Iambic/Trochaic Law:

- a. Elements contrasting in intensity naturally form groupings with initial prominence.
- b. Elements contrasting in duration naturally form groupings with final prominence.

(Hayes 1995: 80)

This is a general constraint on rhythmic grouping which motivates us to form certain types of groupings out of a sequence of sounds, and which has been experimentally confirmed with non-linguistic as well as linguistic tasks (cf. Bolton 1894; Woodrow 1909, 1951; Cooper and Meyer 1960; Allen 1975; Bell 1977; Hayes 1995). I assume, following Hayes (1995), that this constraint reflects human perceptual preference, and that (the (b) part of) it exerts strong pressure on the optimal iambic structure. It thus gives system-independent preference to a disyllabic foot with a large durational contrast between the preceding short syllable and the following long syllable, over to one with a smaller or no contrast at all. This constraint, therefore, ensures that the sesquisyllabic foot with a large durational contrast between the two syllables (C(C)-CVC) is a “better iamb” than the disyllabic foot with two major syllables (CV-CVC) and than the monosyllabic foot (CVC), although the latter two are “good enough”, i.e., acceptable/legitimate, if not unmarked/canonical.

This analysis is consistent with the following observations made by Hayes (1995) and others. First, there are a great number of languages where the foot with even duration and final prominence (LĹ) is converted to the canonical iamb (LĤ) by lengthening the vowel in the second syllable (e.g., Hixkaryana, Macushi, Surinam Carib, Choctaw, Chickasaw,

Menomini, Potawatomi, Cayuga, Onondaga, Seneca, St. Lawrence Island Yupik, Central Alaskan Yupik, Pacific Yupik, Kashaya, Maidu, Sierra Miwok, Yidj). Second, there are also languages that increase the durational contrast of the iambic foot by geminating the initial consonant of the following foot (e.g., Munsee, Unami, Menomini, Seward Peninsula Inupiaq, Central Alaskan Yupik, Pacific Yupik, Southern Paiute). Third, as touched upon earlier, there are a number of languages that make a difference in duration by reducing the number of stressless vowels and/or contrasts (see above). Moreover, such lengthening and shortening are much less common in trochaic languages. Finally, it is true that there are a few trochaic languages with lengthening of the stressed vowel (e.g., Chimalapa Zoque, Icelandic, Mohawk), but such (moraic) trochee languages have shortening of the stressed vowel as well,¹⁶⁾ whereas it never occurs in iambic languages. This suggests that it, unlike iambic lengthening, is not motivated by the Iambic/Trochaic Law. In fact, trochaic lengthening tends to be (i) phonetic in the sense that the lengthened vowel is not as long as the phonologically long vowel and (ii) limited to the main stress syllable, thus suggesting that it is simply a manifestation of stress. Hayes (1995) argues that these observations can all be explained as the effects of the Iambic/Trochaic Law. Due to the rhythmic pressure, iambic languages tend to maintain the durational contrast of the foot by lengthening the stressed syllable and/or shortening the stressless syllable. Consequently, such processes are frequent, robust, and represented structurally at the phonological level. On the other hand, trochaic languages have no motivations to optimize the foot structure by such processes. Therefore, lengthening of the stressed syllable is less common (even if it occurs, it is likely to be a side effect of stress), and even its shortening occurs. Viewing the Aslian sesquisyllabic structure from this perspective, we can take it as a grammaticalized form of the canonical iamb, which is attributed to the

16) Hayes suggests that such shortening is functionally motivated in the sense that it makes a string of syllables with even duration and allows a maximal parse of syllables into perfect moraic trochees.

above domain-general and system-independent constraint on rhythmic grouping.

Given this claim, one might argue that the sesquisyllabic iamb cannot be the *universally* unmarked prosodic structure, simply because it is not permitted in all the iambic languages, let alone in the trochaic or non-stress-based languages. Obviously, it is not. The unmarked structures of a language were tentatively defined earlier as ones that have one or more system-independent motivations. Such motivations, however, do not always work in perfect harmony with one another. It is often the case that one motivation is in conflict with another (recall the inherent conflict between the speaker- and hearer-oriented constraints touched upon earlier). This *is* the case for the sesquisyllabic structure, too. The unmarked *foot* structure motivated by the perception system is in conflict with the unmarked *syllable* structure, which is motivated by another language-external system: the motor control system. I assume with MacNeilage and Davis that the canonical syllable structure is CV, and that it is motivated by the universal motor base for speech: a rhythmic open/close alternation of the mandible (cf. MacNeilage and Davis 1990, MacNeilage 1997). This is supported by observations about (i) the child's acquisition order of syllable structures, (ii) the adult's usage of them in natural discourse, and (iii) their typological distribution. First, CV is the type of syllable that overwhelmingly dominates children's vocal output at the early stages of development, including the babbling stage (cf. Vihman 1996). Second, it is used by adult speakers with the highest frequency in natural discourse, even in languages like English that allow very complex syllable structures (cf. Dauer 1983). Third, it is most widely attested in the world's languages: there are almost no languages without it (cf. Blevins 1995; see Breen and Pensalfini 1999 for an arguable exception).

Assuming these perceptual and motoric motivations, I suggest that their conflict is resolved by ranking them in each language, and that the perceptual motivation is favored in the Aslian languages whereas the motoric motivation is ranked higher in many other languages where CV is

omnipresent. That is, language-external motivations provide a set of candidates of system-independently unmarked structures for languages, and each language selects one (or more) of them as its canonical structure(s). To be sure, this analysis does not explain completely why a given language has a certain structure as the canonical one, but does restrict the range of unmarked structures for human languages to a large extent. This system-independent characterization of unmarkedness is one of the main points of this study.¹⁷⁾

Having discussed motivations for system-independently unmarked structures in general and for the canonical prosodic structures of Temiar and Semai in particular, let us next consider how they can be described in OT terms. More specifically, what constraints are required to describe the canonical iambs ($CC-C\acute{V}C$ and $C-C\acute{V}C$), differentiating them from the non-canonical but legitimate ones ($CV-C\acute{V}C$ and $C\acute{V}C$)? First, the following constraint suffices to distinguish mono- and di-syllabic feet:

(34) Foot Binarity (σ): The foot must be disyllabic.

Given this constraint, the superiority of the disyllabic foot (LH) over the monosyllabic one (H) follows as its effect. Second, as indicated earlier, NUVP accounts for the difference between the sesquisyllabic foot with a minor syllable ($C(C)-CVC$) and the disyllabic one without it ($CV-CVC$). This constraint must be ranked high enough for its effect to emerge in Temiar and Semai, whereas in languages where bare-consonant syllables are completely prohibited, it must be outranked by a constraint that masks its effect (e.g., by the one that prohibits syllables with no vocalic nucleus). It is not the case, however, that the effects of these two crucial constraints (Ft-Bin (σ) and NUVP) are always visible in Temiar and Semai; for words with no minor syllable like $CV-CVC$ or CVC are also acceptable (e.g. (8)–(10)). This observation suggests that the above two constraints are outranked by the following I-O faithfulness constraints, which militate

17) Another point is a system-dependent characterization of unmarkedness, which will be made in the next section.

against deletion and epenthesis:

- (35) Max-IO: Every segment in the input must have a corresponding segment in the output.
- (36) Dep-IO: Every segment in the output must have a corresponding segment in the input.

We have seen the types of words whose syllables are all parsed into a foot. As described above, however, Temiar and Semai have words with three or more syllables, where minor and/or major syllables are concatenated with each other (recall (20) and (22f)). To accommodate such polysyllabic words, we need to assume the following constraint on syllable parsing and to rank it lower than Max-IO:

- (37) Parse- σ : The syllable must be parsed into a foot.

This ranking ensures that Temiar and Semai have polysyllabic words, with some syllable(s) unparsed into a foot. For example, a word like (20ai) *k.rm.wa:k* ‘frame’ is parsed into a foot as follows: *k_.(r_n.wa:k)*.

Such unparsed minor syllables, however, cannot occur after any major syllable within a prosodic word. In Temiar and Semai, as stated in (22g), the minor syllable always precedes the major syllable within a prosodic word. This property can be captured by the two constraints in (27) and (28): Iambic and Align-Ft (Ft, R, PrWd, R). Because they stand at the top of the hierarchy, illegitimate structures like (21) are correctly ruled out.

Summarizing, the constraints that are directly responsible for the canonical prosodic structures in Temiar and Semai are the following eight: Onset, *Complex, Final-C, Iambic, Align-Ft (Ft, R, PrWd, R), NUVP, Ft-Bin (σ), and Parse- σ . There are three important points to be noted here. First, the canonical/unmarked prosodic structures in Temiar and Semai, the sesquisyllabic iambs (C-C \acute{V} C) and (CC-C \acute{V} C), are *independently motivated* by the general constraint in (33).¹⁸⁾ Second, the con-

18) Given the Iambic/Trochaic Law and the three-way distinction of light syllables proposed above, it follows that C-CVC is a better iamb than CC-CVC

straints that are directly responsible for them are meant to be the ones that must all be satisfied simultaneously to yield them. That is, they are not necessarily equivalent to the “active” constraints (the ones that are ranked higher than I-O faithfulness constraints) in the language. Third, it is therefore not the case that the above eight constraints are always satisfied in Temiar and Semai. The last three constraints (NUVP, Ft-Bin (σ), and Parse- σ) are outranked by Max/Dep-IO, and are thus sacrificed when their violation is compelled by one or both of the dominating I-O faithfulness constraints. In this case, iambic feet like the following would emerge: (CV.CVC), (CVC), C_(C_C.CVC), C_C.(C_C.CVC), C_(CV.CVC), etc. That is, the above eight constraints are all satisfied when yielding the *canonical/unmarked* prosodic structures, but three of them are violated when yielding the *acceptable but non-canonical/marked* structures. In contrast to these high-ranking constraints, a prosodic constraint (No-Coda) is often violated in Temiar and Semai, even when yielding their canonical structures. It must accordingly be ranked low in the hierarchy.

With this constraint ranking in mind, let us see how these prosodic and I-O faithfulness constraints interact with B-R identity constraints to generate the five types of reduplication in Temiar and Semai.

3.2 Temiar and Semai Reduplication

This section develops an OT analysis of Temiar and Semai reduplication, showing in turn how it works for the five types of reduplication. Answers to the main questions in (5) are given along the way.

Let us begin with the prefixal reduplication of Type 1: $C_1C_r.C_1V(:)C_r$; e.g., *kw.kɔ:w*. The crucial B-R identity constraints required to accommodate this type of reduplication are the following two:

since the minor syllable of the former is lighter than that of the latter. I suspect that it *is*, on the basis of the number of their occurrences in the available data (there are more C-CVC words than CC-CVC words), but do not attempt to formulate a constraint to distinguish between the two in this article.

- (38) Max-BR: Every segment of B has a correspondent in R.
 (39) SRole: A segment in R and its correspondent in B must have identical syllable roles.

If we assume SRole and rank Max-BR higher than No-Coda but lower than the other constraints, then we can account for that apparently unusual type of reduplication.¹⁹⁾ Let us see how this ranking works, using several crucial constraints for expository purposes:²⁰⁾

(40) Aslian Reduplication of Type 1:

[Input: RED, <i>kɔ:w</i>]	Onset	*Complex	Iambic	Align- Ft	NUVP	Ft-Bin (σ)	Max- BR	No- Coda	SRole
a. \emptyset (<i>k_w.kɔ:w</i>)							**	**	
b. (<i>_w.kɔ:w</i>)	*!						***	**	
c. (<i>kw_</i> <i>kɔ:w</i>)		*!					**	*	*
d. (<i>kɔ:w.k_w</i>)			*!				**	**	
e. (<i>kɔ:w</i>) <i>kɔ:w</i>				*!	*	*		**	
f. <i>kɔ:w</i> (<i>kɔ:w</i>)					*!	*		**	
g. (<i>kɔ</i> . <i>kɔ:w</i>)					*!		**	*	
h. (<i>k_</i> . <i>kɔ:w</i>)							***!	*	
i. (<i>w_k</i> . <i>kɔ:w</i>)							**	**	*!*

Notice first that the candidate in (a) respects all of the first six prosodic constraints (and SRole) at the expense of the lower-ranking constraints Max-BR and No-Coda, whereas the competitors in (b)–(g) all violate one or more of the higher-ranking constraints. Candidates (b) and (c) run afoul of Onset and *Complex, respectively. Candidate (d) breaches another top-ranking constraint: Iambic.²¹⁾ Candidates (e) and (f) violate

19) SRole is crucial for the selection of the optimal candidate, but its ranking with respect to the other constraints is not.

20) SRole is tentatively put at the end of the hierarchy in the following tableau, but, as stated just above, it is neutral in terms of ranking.

21) The following anchoring constraint may also play a role in ruling out candidate (d), which asserts system-independent preference to prefixal (rather than suffixal/infixed) reduplication:

(i) Left-Anchor (Base, Reduplicant): The left edge of the reduplicant corresponds to the left edge of the base. (cf. Nelson 2002)

NUVP, and Ft-Bin (σ), with (e) violating Align-Ft as well.²²⁾ Candidate (g) obeys the two constraints on foot, but violates NUVP. How about candidate (h), then? It, like candidate (a), satisfies all of the first six prosodic constraints, and incurs one less violation of No-Coda than (a) does. However, it incurs one more violation of the higher-ranking constraint Max-BR, thus losing out. Candidate (i) avoids this problem about Max-BR by copying two consonants as (a) does. But it, unlike (a), copies the base onset *k* in the coda position and the base coda *w* in the onset position, which incurs two violations of SRole. Consequently, the sesquisyllabic iamb in (a) correctly wins out as the optimal form.

There are a number of important points to be noted about this reduplication. First of all, this example represents the emergence of the canonical prosodic structure in Temiar and Semai: the disyllabic iamb with a minor syllable (CC-CVC). That is, it can be explained as an instance of the emergence of the unmarked in the particular sense stated earlier: *the independently-motivated canonical structure of a language is utilized for a new function and makes its appearance*. This is the main thesis of this article.

Second, this unmarked form is created by adding to the base (CV:C) a reduplicant that has an illegitimate prosodic structure in itself (CC). This is a relatively rare type of the emergence of the unmarked; for the common type is such that a prosodically unmarked structure emerges *as a reduplicant*, as illustrated earlier in brief (recall (3) and (4), and see the references cited there for detailed discussion and illustration). Third, the shape and position of the reduplicant both fall out of the interaction of independently motivated constraints. Unlike previous studies (see, among others, Sloan 1988 and Gafos 1998), neither special templates nor alignment constraints need to be stipulated only for this type of reduplication.²³⁾ Fourth, the unusual B-R association pattern also follows from the

22) To be precise, (e) and (f) run afoul of the constraint on syllable parsing in (37) as well, because they have a syllable that is not footed.

interaction of usual constraints. Unlike some previous analyses (see Sloan 1988 for instance), no special association rule is required.

Note also that the base form (CV:C) meets the Iambic condition by itself, but the reduplicated disyllabic form is a better iamb than it in terms of Ft-Bin (σ). Thus, this example represents the emergence of the unmarked with respect to Ft-Bin (σ) in the technical sense: the effect of a constraint emerges when a higher-ranking constraint is not applicable (cf. McCarthy and Prince 1994, 1995, 1999; Prince and Smolensky 1993/2004; and many others). Recall that the effect of Ft-Bin (σ) is not always visible in Temiar and Semai, due to the dominating I-O faithfulness constraints, as illustrated in (8) and (9). It emerges, however, in reduplicated forms, because the faithfulness constraints do not apply to the reduplicant, which by definition has no underlying representation. The (g) candidate (CV-CV:C) is also better than CV:C in terms of Ft-Bin (σ), but the optimal foot (CC-CV:C) is even better in terms of NUVP. The effect of this constraint, like that of Ft-Bin (σ), is not always visible in the base, since it is outranked by Max/Dep-IO (which is evidenced by (10) and (11)). But it also emerges in reduplication, since NUVP as well as Ft-Bin (σ) is ranked higher than Max-BR; recall that NUVP plays a decisive role in selecting (a) over (g). It thus turns out that (40) is an example of the emergence of the unmarked with respect to NUVP, too. Moreover, the disyllabic iamb with a non-moraic minor syllable C-CV:C in (h) might be prosodically better than the one with a moraic minor syllable CC-CV:C in (a); recall footnote 18. In fact, however, the latter is favored over the former in the above competition. This is presumably because C-CV:C does not serve

23) This does not mean, however, that no alignment constraints are needed for *any* type of reduplication in Temiar and Semai. As we see later, reduplication-specific alignment constraints are not needed for the reduplication of Types 1–3, but *are* needed to account for the two types of expressive reduplication (Types 4 and 5). Incidentally, Gafos's (1998) analysis requires a reduplication-specific alignment constraint for Types 1–3 (whereas the analysis being developed here does not), and it does not accommodate Types 4 and 5 (whereas the present analysis does). See Miyakoshi (2005a) for comparison between them.

the semantic function of reduplication so well as its rival does. Assuming that the function of reduplication can be satisfied better by copying more segments than less, it follows that CC-CV:C is better than C-CV:C *as a reduplicated form*. This is the effect of Max-BR. Why not always copy all the segments, then? Because this constraint is ranked low enough, crucially, lower than the constraints that are directly responsible for the canonical prosodic structures in Temiar and Semai: Onset, *Complex, Final-C, Iambic, Align-Ft (Ft, R, PrWd, R), NUVP, Ft-Bin (σ), and Parse- σ . This constitutes an answer to the main questions posed in (5). Given the constraint ranking specified above, it follows that the sesquisyllabic iamb CC-CV:C is the system-dependently unmarked prosodic structure in Temiar and Semai, and that it is likely utilized for reduplication in those languages, but not in other systems where the relevant constraints are ranked in different orders.

Let us turn to Aslian reduplication of Type 2: $C_1(.r/t.r)C_f.CV(:)C_f$; e.g., *sg.lɔg*. If we assume the constraint on syllable parsing in (37) and rank it above Max-BR, then the infixal reduplication also follows:

(41) Aslian Reduplication of Type 2:

[Input: RED, <i>s.lɔg</i>]	Iambic	NUVP	Ft-Bin(σ)	Parse- σ	Max-BR	SRole
a. $\mathcal{C}^{\mathcal{P}}(s_g.lɔg)$					***	
b. (l_g)(s_lɔg)	*!		*		**	
c. s_lɔg(lɔg)		*!	*	**	*	
d. s_lɔg (s_lɔg)		*!		**		
e. s_l g (lɔg)			*!	**	**	
f. s(l_g .lɔg)				*!	**	
g. s_g (s_lɔg)				*!	**	
h. (s_l g)					***	*!

The optimal candidate in (a) satisfies all the constraints except for Max-BR, whereas the alternatives in (b)–(h) do not. Candidate (b) runs afoul of Iambic and Ft-Bin(σ) as well as Max-BR, because it contains an illegitimate and monosyllabic foot. Candidate (c) observes the top-ranking

constraint (Iambic) but breaches the three mid-ranking ones (NUVP, Ft-Bin(σ) and Parse- σ). Candidate (d) takes the form of total reduplication, which satisfies Max-BR completely. But it violates NUVP and Parse- σ . Candidate (e) incurs less violations of Max-BR than (a) does, but does not obey Ft-Bin(σ) and Parse- σ , both of which (a) respects. This suggests that those two prosodic constraints are both ranked higher than Max-BR. Candidates (f) and (g) meet the conditions on foot forms, segmental contents, and B-R association patterns. Moreover, they incur one less violation of the maximal copying constraint than candidate (a) does. However, they sacrifice the higher-ranking constraint on syllable parsing, whereas the optimal candidate does not.²⁴⁾ Candidate (h) avoids a violation of NUVP by copying no offending vowel, but the copied segment has a different syllable role from the corresponding segment in the base, which leads to a violation of SRole. It thus turns out that the candidates in (b)–(h) are all less harmonic than (a) and lose out.²⁵⁾

Note here that the candidates in (g) and (c) look like reduplicated forms of Types 4 and 5, respectively, and that they are both correctly ruled out as the optimal candidate for the reduplication of the type under discussion: Type 2. Note also that the present analysis excludes them without stipulating any templatic and alignment constraints for reduplication (whereas the previous analyses posit such devices and yet fail to accommodate Type 2 while distinguishing it from Types 4 and 5; recall footnote 23).

Let us move on to the third type: $C_1a.C_1V(:)C_P$; e.g., *ka.kɔ:w*. To handle this type of reduplication, a prespecification of the vowel *a* must be

24) This effect might be obtained by a constraint on minimizing structure (*Struc) instead of Parse- σ , because (f) and (g) create one more syllable than (a) does.

25) An anonymous reviewer poses a question of how this analysis applies to other examples of Aslian reduplication of Type 2. For example, as shown in (1bii), the correct reduplicated form of *sr.lɔg* ‘to lay down’ is *s_(r_g.lɔg)*, but how does the present analysis prevent the emergence of forms like *s_r_(l_g.lɔg)*? I leave this problem for future research, but expect that the key to the solution lies in the causative affix *r/tr*; for this problem appears to only arise in cases with it.

made, but no more assumptions are necessary:²⁶⁾

(42) Aslian Reduplication of Type 3:

[Input: a^{RED} , $k_2:w$]	Iambic	Align-Ft	Max-IO	NUVP	Max-BR
a. $\overline{\text{ka}}$ (ka .k \acute{o} :w)				*	***
b. (ko:w .k \acute{o} :w)	*!		*	*	
c. (kaw .k \acute{o} :w)	*!			*	**
d. (kaw)(k \acute{o} :w)		*!		*	**
e. (k_w .k \acute{o} :w)			*!		**

The candidate with the prespecified vowel in (a) satisfies the first three constraints while sacrificing NUVP and Max-BR. The total reduplication form in (b) observes the B-R identity constraint, but pays high costs for it: a violation of as many as three higher-ranking constraints: Iambic, Max-IO, and NUVP. If the vowel of the first syllable in (b) is replaced by the prespecified one, then Max-IO is satisfied. But the top-ranking candidate Iambic (in addition to NUVP and Max-BR) is still breached, as shown in (c). If the first syllable constitutes a foot on its own, then Iambic as well as Max-IO is satisfied, as shown in (d). However, it fatally violates another high-ranking constraint (Align-Ft), because it contains a foot that is not properly right-aligned. The candidate with a minor syllable in (e) spares a violation of Iambic, Align-Ft and NUVP by copying no vowel, but instead incurs a fatal violation of the I-O faithfulness constraint. It accordingly turns out that the optimal reduplicant of Type 3 takes the shape of CV.

It should be emphasized that this light syllable is system-independently unmarked, and that it can nevertheless appear as a reduplicant in Temiar and Semai *iff* the vowel is prespecified. This is because NUVP is ranked relatively high (and the I-O faithfulness constraints even higher) in those languages. Recall that NUVP would otherwise militate against the presence of a vowel in the position that the prefixal reduplicant occu-

26) Even this vowel prespecification may be explained as an instance of the emergence of the unmarked at the segmental level, perhaps along the line of Alderete et al. (1999).

pies, and would favor the system-dependent unmarked structure: the sesquisyllabic iamb. The emergence of CV as a reduplicant thus hinges upon the prespecification of the vowel *a*.

Let us next consider the two types of expressive reduplication (Types 4 and 5). I argue that two distinct alignment constraints are required to accommodate them while distinguishing them from each other and from Type 2. Let us see how the OT system works for them in turn, beginning with Type 4: $C_1C_f.C_1(.CV).CV(:)C_f$; e.g., *gp.g.hup*. For this type of expressive reduplication, the following alignment constraint is required:

- (43) Align (Affix₄, R, Stem, L): The right edge of Affix₄ must be aligned with the left edge of the stem, where ‘Affix₄’ is expressive (prolongation or continuous repetition in time).

If we rank this constraint higher than Parse- σ and Max-BR, then the optimal form emerges, as shown in the following tableau:

- (44) Aslian Reduplication of Type 4:²⁷⁾

[Input: RED, <i>g.hup</i>]	Align-Affix ₄	Parse- σ	Max-BR
a. $\overline{\text{g}}\text{-p}(\text{g_húp})$		*	**
b. $\text{g_hup}(\text{g_húp})$		***!	
c. $\text{g_}(\text{g_húp})$		*	***!
d. (g_p.húp)	*!		***
e. $\text{g_hup}(\text{húp})$	*!	**	*

Candidate (a) satisfies Align-Affix₄, at the expense of the two lower-ranking constraints. All the other candidates fare no better than it, and it is correctly selected for this type of reduplication. Candidate (b) loses out at the second competition, since it incurs one more violation of Parse- σ than (a) does. Candidate (c) is tied to candidate (a) with respect to the first two constraints, but incurs one more violation of Max-BR. It thus yields to (a), presumably for the same functional reason as (40h) loses against

27) Stem boundaries are indicated by hyphens.

(40a); recall the discussion given above. The candidate in (d) looks like a form for the infixal reduplication of Type 2, but is correctly ruled out as a form for the expressive reduplication in question. Notice here that if there were no alignment constraint, then the candidate of the shape CC.CVC, being prosodically desirable in the language, would beat the candidate in (a). That is, it is the alignment constraint in (43) that plays a crucial role in distinguishing the reduplication of Type 4 from Type 2.

How about candidate (44e), then? That looks like a reduplicated form of Type 5: $C_1(.CV).CV(:)C_1.CV(:)C_1$; e.g., *d.yɔ̃:l.yɔ̃:l*. To be sure, the constraint in (43) suffices to correctly rule it out. But the problem is: as things now stand, a form like (44e) would *never* emerge as a reduplicated word in Temiar and Semai. As long as (43) is ranked in the present position and exerts its effect in the way described above, candidate (44e) would *always* lose to (44a). On the other hand, as pointed out above, if that alignment constraint is abandoned completely, then the unmarked prosodic form in (44d) would *always* win the competition. Moreover, even if the alignment constraint is generalized in a way that does not specify the right or left edge of the stem to which the reduplicant is attached (and no matter how it is ranked with respect to the other constraints), candidate (44e) would still be ruled out, mainly because it incurs one more violation of Parse- σ than its rival in (44a) does.²⁸⁾ We thus have to keep the specific alignment constraint in (43) for Type 4, and need another one for the arguably suffixal reduplication of Type 5, to which let us turn.

To accommodate that type of reduplication while distinguishing it from Types 2 and 4, the following alignment constraint is required, and it needs to be ranked higher than NUV_P and Ft-Bin (σ) as well as Parse- σ :

- (45) Align (Affix_s, L, Stem, R): The left edge of Affix_s must be aligned with the right edge of the stem, where ‘Affix_s’ is expressive (repetition at intervals of time).

28) This is also because it violates NUV_P whereas the competitor does not.

Let us see if the interaction of these constraints correctly gives rise to the optimal form for Type 5, with the following tableau:

(46) Aslian Reduplication of Type 5:

[Input: RED, <i>d.yɔ̃:l</i>]	Align-Ft	Iambic	Align-Affix _s	NUVP	Ft-Bin (σ)	Parse- σ
a. $\text{d}_- \text{y}\acute{\text{ɔ}}\text{:l}-(\text{y}\acute{\text{ɔ}}\text{:l})$				*	*	**
b. $(\text{d}_- \text{y}\acute{\text{ɔ}}\text{:l})-(\text{y}\acute{\text{ɔ}}\text{:l})$	*!	*		*	*	
c. $\text{d}_- (\text{y}\acute{\text{ɔ}}\text{:l}-\mathbf{d}_\mathbf{l})$		*!				*
d. $(\mathbf{d}_\mathbf{l} \text{y}\acute{\text{ɔ}}\text{:l})$			*!			
e. $\mathbf{d}_\mathbf{l} (\text{d}_- \text{y}\acute{\text{ɔ}}\text{:l})$			*!			*

The candidate in (a) respects all the first three constraints at the expense of the last three. On the other hand, the alternatives all fail to satisfy one or more of the dominating constraints.²⁹⁾ Candidate (b) violates both Align-Ft and Iambic. Candidate (c) obeys Align-Ft, but breaches Iambic. The candidates in (d) and (e), unlike the above ones, have legitimate prosodic structures and look like reduplicated forms of Types 2 and 4, respectively. They should thus be rejected as a candidate for the particular type of reduplication under consideration, not for Aslian reduplication in general. The alignment constraint in (45) exactly serves this function. It correctly rules them out as the candidates for the reduplication of Type 5, but does not commit itself to other types of reduplication. In cases where it is not at stake, as shown earlier, the OT system correctly yields the optimal candidates for Types 2 and 4.

What should be noted about this analysis is that it explains the shape of the reduplicant for this type of reduplication (as well as for the other four), without stipulating any template. Given the OT system developed above, together with the assumption that Type 5 is suffixal reduplication,

29) Since stress usually falls only on the word-final position in the Aslian languages, I here assume tentatively that it does when the heavy syllable is reduplicated, too. If stress turns out to fall on both the base and the reduplicant, then they would each constitute a prosodic word, and the following structure would be optimal where the base as well as the reduplicant is footed: $(\text{d}_- \text{y}\acute{\text{ɔ}}\text{:l})-(\text{y}\acute{\text{ɔ}}\text{:l})$. Unfortunately, there are no decisive data available about this problem.

then it *follows* that the reduplicant takes the shape of CVC.

We have accommodated the reduplication of Types 4 and 5 while distinguishing them from each other and from Type 2. Interestingly, in fact, the two types of expressive reduplicants can co-occur in Temiar and Semai, which is exemplified by (47):

(47) $d.y\tilde{o}:l \rightarrow \mathbf{dl.d.ra.y\tilde{o}:l.y\tilde{o}:l}$

‘appearance of several objects floating down repeatedly in several places’ (*ra* is an infix indicating that “the pattern, the movement, the sensation or the sound occurs in several places” (Diffloth 1976b: 253))

The present analysis can even account for double reduplication forms like this, without any additional assumption:^{30,31)}

(48) Aslian Reduplication of Types 4 and 5:

[Input: RED ₄ , RED ₅ , $d.y\tilde{o}:l$]	Align-Affix ₄	Align-Affix ₅	NUVP	Parse- σ
a. $\mathbf{d_l.d_y\tilde{o}:l-(y\tilde{o}:l)}$			*	***
b. $d_y\tilde{o}:l-(y\tilde{o}:l)$	*!		*	**
c. $\mathbf{d_l-(d_y\tilde{o}:l)}$		*!		*

The optimal candidate in (a) satisfies both align-affix constraints by having two reduplicants in the appropriate positions. On the other hand, the failed candidates in (b) and (c) obey only one of them, thus both losing out as the double reduplication form.

4. Summary and Directions for Future Research

This article has demonstrated that the five types of Aslian reduplication are all derived from the interaction of (i) several constraints on the regular prosody of the language, (ii) familiar I-O and B-R correspon-

30) As we saw earlier, Align-Affix₄ should be ranked above Parse- σ , and Align-Affix₅ above NUVP and Ft-Bin (σ) as well as Parse- σ . But there is no empirical reason to rank Align-Affix₄ with respect to constraints other than Parse- σ . In (48), it is tentatively put in the same position as Align-Affix₅.

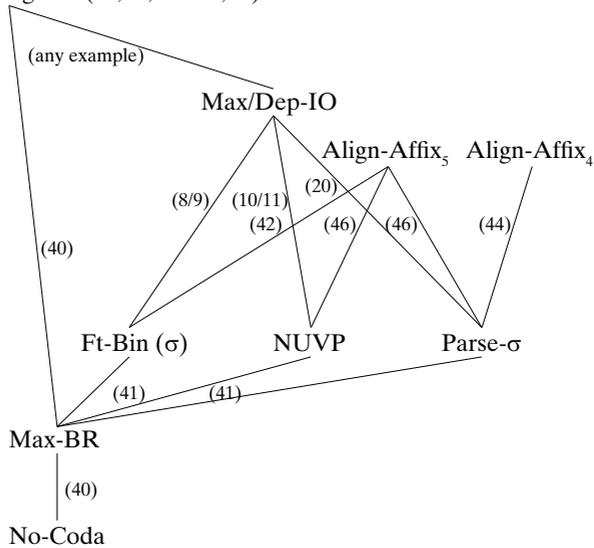
31) For the sake of simplicity, the irrelevant infix *ra* is put aside in the tableau.

dence constraints, and (iii) two types of alignment constraints for expressive reduplication. These constraints and their ranking are summarized as follows:

(49) **Constraint Ranking in Temiar and Semai:**

Onset, *Complex, Final-C

Iambic, Align-Ft (Ft, R, PrWd, R)



Particularly crucial for Temiar and Semai prosody are the eight prosodic constraints: Onset, *Complex, Final-C, Iambic, Align-Ft (Ft, R, PrWd, R), Ft-Bin (σ), NUVP, and Parse-σ. These are directly responsible for the canonical prosodic structure of Temiar and Semai: the sesquisyllabic iamb $[(C(C)-C\acute{V}C)_{Ft}]_{PrWd}$. They are all ranked higher than the reduplication-specific constraint Max-BR, and it is this ranking that gives rise to the emergence of unmarked prosody in Aslian reduplication.

Under this analysis, the apparently unusual types of reduplication in Temiar and Semai turn out to make perfect sense. Given their canonical prosodic structure, which is motivated independently of reduplication, adopting the sesquisyllabic form for the purposes of reduplication is

the optimal way for them to enhance expressive power while making the best use of the existing structure. Aslian reduplication thus turns out to be explained as an instance of the emergence of the unmarked in the particular sense that has been discussed throughout the paper: the independently-motivated canonical structure of a language is utilized for a new function and makes its appearance.

This concludes the analysis of Aslian reduplication, but if one is to seek a deeper explanation of the emergence of the unmarked while broadening the range of descriptive coverage, then he/she needs to address further questions about it. Let us finally consider two of them in brief, as directions for future research.

First, I have shown that several constraints are ranked in a way that leads to the emergence of unmarked prosody in Aslian reduplication, but one might wonder why they are ranked in such a way in the first place. Is that just an accident? Or is there any motivation for it? We might be able to settle this question by checking how pervasively the emergence of unmarked prosody in reduplication is observed across languages. As is well-known, it *is* ubiquitous in the world's languages; more precisely, it is widely observed that an unmarked or a less marked prosodic structure than the language as a whole emerges in reduplication (for illustration, see Miyakoshi 2005a and the references cited therein). Certainly, this has been described by many linguists. Particularly, the proponents of OT/Prosodic Morphology have not simply described it, but have also accounted for it elegantly, in terms of the following constraint ranking (see McCarthy and Prince 1986/1996, 1993a, b, 1994, 1995, 1999; Prince and Smolensky 1993/2004 among many others):

(50) I-O Faithfulness >> Phono-Constraint >> B-R Identity

If the emergence of the unmarked is an absolute universal, i.e., universally holds true without any exception, then it would suffice to simply fix (50) as a universal nonpermutable constraint hierarchy. However, in fact, there are a few cases of the emergence of *the marked* as well, one

of which is reduplication in Mangap-Mbula (an Austronesian language). Spaelti (1997) observes some Mangap-Mbula examples where a CVC syllable emerges as a prefixal reduplicant, although closed syllables are otherwise not permitted in word-initial/internal positions in the language:

- (51) Reduplication in Mangap-Mbula
- a. **bad**-'baada 'you (sg) be carrying'
 - b. **mot**-'mooto 'worms'
 - c. i-**tor**-'tooro '3sg-turn'

These examples thus indicate that the emergence of the marked is not prohibited altogether in human languages (see Coetzee 2001 and Struijke 2002 for other examples of the emergence of the marked).

But it should also be noted that CVC syllables are not completely prohibited in this language; they *do* occur in the word-final position, as exemplified by (52):

- (52) a. posop 'you sg. finish'
- b. time^ader 'they stand'
 - c. tipo^mbol 'they cause-be strong'

Their emergence as reduplicated forms should thus be taken as an instance of the emergence of a *slightly* (rather than a great deal) more marked structure than the language as a whole.

Therefore, a proper descriptive generalization is likely to be that *the emergence of unmarked prosody in reduplication is pervasively observed, whereas that of the marked is exceedingly rare; even if it is permitted, only a slightly marked structure can emerge*. At least, we can safely claim that the emergence of the unmarked is not an absolute universal, but is rather likely to be a universal *tendency*. Fixing the skeletal ranking in (50) thus seems too strong. On the other hand, simply abandoning it altogether would make the theory too weak. Without it, the ubiquity of the emergence of unmarked prosody in reduplication would be left unexplained, just as an accident; that is, the emergence of the unmarked would be

predicted to be as likely as that of the marked. This question of how to capture a universal tendency is yet to be addressed within the framework of OT.

Another residual question about the emergence of the unmarked concerns its ubiquity *within* (as opposed to across) languages. The question is: Is it only in prosodic morphology that the utilization of an independently-motivated structure for a new function is observed? The answer seems to be in the negative: it manifests itself in various aspects of language, ranging from segmental inventories to grammatical constructions. For instance, consider the consonantal inventories of languages. As many linguists have pointed out, what consonant a given language has depends strongly on what other consonants it has, and once a consonant with a certain set of features is established in the inventory, other consonants sharing those features become likely to be the members of that system than the ones that are completely independent of it (for illustration, see Sapir 1921: chapter 8; Trubetzkoy 1939/1969: chapter 3; Postal 1968: chapters 4 and 8; Lindblom 1992; Clements 2003; Miyakoshi 2005a, b). This suggests that languages strongly tend to constitute a segmental system by making the best use of features. In other words, they tend to maximize the number of consonants with least features.³²⁾ Therefore, the highly (if not completely) systematic paradigm of consonants that many languages exhibit can be taken as another manifestation of the emergence of the unmarked.

The emergence of the unmarked is widely observed in grammatical constructions, too. It is often the case that once a construction is entrenched in the grammar of a language, then it comes to be used for

32) Notice that the maximization of the number of segments is attributed to the hearer-oriented constraint requiring that perceptual distinctions be maximized for communicative purposes, whereas the minimization of the use of features is due to the speaker-oriented economy constraint. Recall the discussion given in section 3.1: the hearer-oriented perceptual constraint is inherently in conflict with the speaker-oriented motoric constraint, and they need to be resolved one way or another in any language (see the references cited there for further discussion of this matter).

similar functions. For example, if change-of-location events are conventionally encoded by the verb-particle construction in a given language, then change-of-state events tend to be coded by a similar construction (the resultative construction) in that language. Likewise, if a given language adopts the verbal compound construction to encode motion events, then that construction tends to be exploited for the purposes of depicting similar events. Such recycling of a well-entrenched structure for a new function is pervasively observed in syntax and semantics, as well as in phonology and morphology, which suggests that language has a set of general constraints that are responsible for it (see Miyakoshi 2005b for detailed discussion and illustration).

Accordingly, it seems that the emergence of the unmarked is an essential property of language, and that it should be taken and explained as such by linguistic theory. Thus the above two questions about its pervasive distribution within and across languages seem worth discussing further, and the implications of the present study will be properly understood in a wider picture that is expected to emerge through it in the future.

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無標形の発現としてのアスリ諸語の重複

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本稿は、独立に動機付けられた無標構造が新たな機能のために利用され、その姿を現すという意味の「無標形の発現」について論じる。この意味での無標形の発現は様々な言語現象に見られるが、本稿では重複における無標の韻律構造の発現に焦点を当て、それをアスリ諸語の重複を例に論じる。アスリ語派の言語には数種類の重複があり、そのうちのいくつかは韻律・形態論的に一見特異に見える性質を持っている。本稿は、そうした一見特異な重複が、通言語的によく見られる重複と同じように、上で述べた意味での無標形の発現現象として説明できることを示す。また、今後の研究の方向性として、そもそもなぜ言語にはそうした無標形の発現がよく見られるのかという問題を提起し、その背後にあると思われる一般的な制約の探究の必要性和重要性を指摘する。

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