

## If Verbal Number is Lo-Low...\*

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**Abstract:** Recent studies have provided evidence for participant number governed suppletion (Bobaljik & Harley to appear; Lee 2014); however, there is cross-linguistic evidence that participant number can also be marked by reduplication. For example, in Niuean, plural internal arguments are marked either by suppletion or by reduplication. Reduplication shows that there is a node in the verb word that reflects number, and that plural is not only expressed on the root. I propose a unified structural account for participant number by reduplication and suppletion where there is a number node internal to the verb. Since this node triggers phonological changes on the root (such as root suppletion), this node must be local to the root (Embick 2010) and therefore low with respect to the morphological domain. I will show that both Niuean and Hiaki provide evidence for a vP-internal #-node that is able to (i) mark plural arguments and events and (ii) phonologically affect the root. If this head triggers root suppletion, then a stricter locality condition can be maintained than Bobaljik & Harley’s proposal that verbal suppletion is conditioned directly by a plural internal argument.

### 1. Introduction

Recent studies have provided evidence for participant number governed suppletion where the number of one of the participants (typically the internal argument) conditions the form of the verb (Bobaljik & Harley to appear; Lee 2014). In (1a), *me’a* ‘kill.singular’ is inserted as the object is singular, and in (1b), *sua* ‘kill.PLURAL’ is inserted as the object is plural.

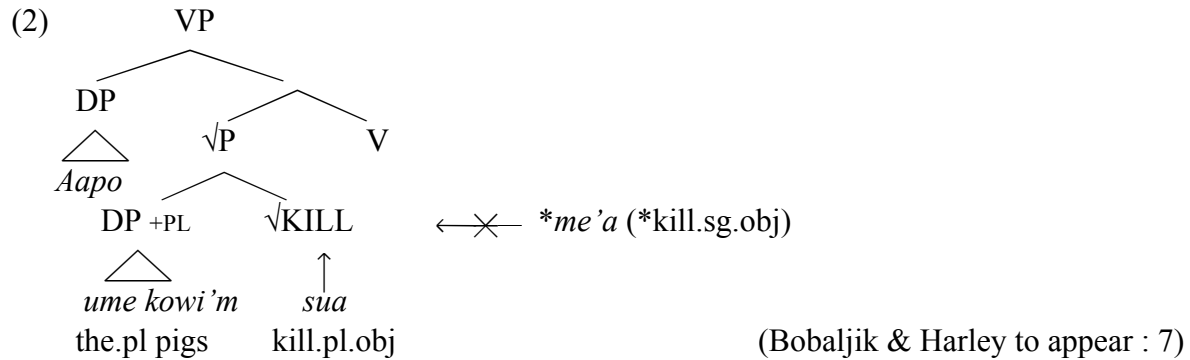
- (1) a. Aapo/Vempo    uka koowi-ta    **me’a-k**  
         3SG/3PL       the.SG pig-ACC.SG    kill.SG-PRF  
         ‘He/They killed the pig.’
- b. Aapo/Vempo    ume kowi-m    **sua-k**  
         3SG/3PL       the.PL pig-PL    kill.PL-PRF  
         ‘He/They killed the pigs.’
- (Bobaljik & Harley to appear : 5)

Bobaljik & Harley (To Appear) propose that Vocabulary Insertion (VI) of a suppletive verb is directly conditioned by plural internal arguments in Hiaki (Uto-Aztecan). The structure in (2)

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shows that *me'a* cannot be inserted when the object is plural. Bobaljik & Harley propose that the internal argument, as sister to the root, is the structural trigger for suppletion. In particular, they claim that there is no verb-internal functional head which mediates the suppletive relationship.



Plural participants in Niuean are also marked by suppletion, but they can also be marked by reduplication. However, reduplication also marks plural events. If reduplication is an affix (Marantz 1982)<sup>1</sup>, then Niuean provides evidence that in some languages, there is a node internal to the complex verb that is sensitive to the number of the internal argument. Since Niuean shows both reduplication and suppletion, I propose that this verb internal number node is always present in participant number marking. This node may be pronounced as a reduplicative affix, or it may be the trigger of root suppletion. Contra Bobaljik & Harley, there is no compelling evidence for a word-external suppletion trigger since plural participants are not just expressed on the root.

## 2. Participant and Event Number in Hiaki and Niuean

### 2.1. Hiaki Suppletion

Prior studies have described participant number as following an absolutive pattern where subjects of intransitives and objects of transitives condition the form of the verb (Durie 1986; Veselinova 2006). Bobaljik & Harley (To Appear) found that, in Hiaki, subjects of intransitives are actually unaccusative verbs. Thus, they argue that internal arguments trigger root suppletion. In (2), VI of *sua* occurs at the  $\sqrt{\text{ }}$ -node since it is a sister to *ume kowi'm* ‘the.pl pigs’ and no phrasal projection intervenes. Therefore, the internal argument acts as a word-external trigger on suppletion. I will argue that Bobaljik & Harley’s analysis does not provide evidence that the trigger for suppletion can ever be a phrasal projection external to the word containing the suppletive root, because their analysis cannot be extended to reduplication for participant number.

### 2.2. Participant Number

As described in Bobaljik & Harley (To Appear), participant number is independent of syntactic agreement as it marks plurality of internal arguments. In fact, Durie (1986) shows that cross-linguistically, participant number marks plurality of the affected argument. Moreover, in lan-

<sup>1</sup> See Raimy (2000) for arguments about whether reduplication is an affix.

*If Verbal Number is Lo-Low...*

guages which also have morphological agreement, internal-argument-driven suppletion patterns independent of the alignment of agreement. Agreement may distinguish between the subject or object in its derived position, but participant number suppletion differentiates between internal versus external arguments as described in Comrie (1982).

Hopi, another Uto-Aztec language, has both syntactic agreement and participant number (Bliss 2005). In Hopi, syntactic agreement marks the plural subject with the suffix, *-ya* as in (3c). In (3), the singular root is inserted as the object in each of these examples is singular. In (4), the suppletive plural root marks participant number as the object is plural.

(3) *Suffixal Plural Agreement*

- |    |   |                  |                |
|----|---|------------------|----------------|
| a. | Taaqa   | taavot           | <b>niina</b>   |
|    | man   | cottontail (sg.) | killed         |
|    | <i>'The man killed a cottontail.'</i>               |                  |                |
| b. | Taaqat  | taavot           | <b>niina</b>   |
|    | men(dl.)  | cottontail (sg.) | killed         |
|    | <i>'The two men killed a cottontail.'</i>           |                  |                |
| c. | Taataqt   | taavot           | <b>niinaya</b> |
|    | men (3+)  | cottontail       | killed         |
|    | <i>'The three or more men killed a cottontail.'</i> |                  |                |

(Hill & Black 1998: 858)

(4) *Suppletion for Object Number*

- |    |  |                  |                             |
|----|--|------------------|-----------------------------|
| a. | Taaqa  | taataptuy        | <b>qöya</b>                 |
|    | man  | cottontails (3+) | killed (sg. subj, pl. verb) |
|    | <i>'The man killed (3 or more cottontails).'</i>                     |                  |                             |
| b. | Taaqat   | taataptuy        | <b>qöya</b>                 |
|    | men (dl.)  | cottontails (3+) | killed (dl. subj, pl. verb) |
|    | <i>'The (two) men killed (three or more cottontails).'</i>           |                  |                             |
| c. | Taataqt  | taataptuy        | <b>qöqya<sup>2</sup></b>    |
|    | men (3+)   | cottontails (3+) | killed (pl. subj, pl. verb) |
|    | <i>'The (three or more) men killed (three or more) cottontails.'</i> |                  |                             |

(Hill & Black 1998: 858)

Hopi also marks participant number by reduplication for internal arguments. (5) shows reduplication marking plural subjects, and (6) shows reduplication marking plural objects.

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<sup>2</sup> Hill & Black (1998:877) note that this form of *kill* is interchangeable with those in (4)a&b.

(5) *Plural Subjects*

		<u>Singular/Dual</u>	<u>Plural</u>
a.	“appear”	kuyva	kuukuyva
b.	“learn of”	navota	nanapta <sup>3</sup>
c.	“be deep”	hö’i	hõõ’i

(6) *Plural Objects*

a.	“cut down”	tsàaqa(~ya)	tsàatsaq/ta (~tota)
b.	“sew”	tuu’iha (tuu’liya)	tuutuu’li/ta(~tota) <sup>4</sup>

In sum, participant number is (i) separate from syntactic agreement; (ii) marks plural internal arguments; and (iii) can be realized in various ways—including both reduplication and suppletion.

### 2.3. Event Number

#### 2.3.1. Niuean

In Niuean, the plural patient/theme can be marked by reduplication (Haji-Abdolheissini, Mas-sam, & Oda (HMO) 2002). Reduplication also marks iterative aspect, which makes plural argument readings available for some verbs (HMO 2002). Suppletion marks the plural subject in (7b), and reduplication marks the plural subject in (8b) and the plural object in (9b).

- (7) a. To **fano** a au                      b. To            **ō** a tautolu  
 FUT go ABS I                              FUT go.PL ABS we(incl)  
 ‘I will go...’                                      ‘We will go...’
- (8) a. Ne hoko mai a Sione              b. Ne **hohoko** mai a laua  
 PAST arrive there ABS Sione            PAST arrive.PL there ABS they  
 ‘Sione arrived/came there.’              ‘They arrived/came there.’
- (9) a. Kua hala e ia e lā akau  
 PERF cut ERG he ABS branchtree  
 ‘He cut the branch.’
- b. Kua **hahala** e ia e tau lā akau  
 PERF cut.PL ERG he ABS PL branchtree  
 ‘He cut the branches.’

(HMO 2002:476)

<sup>3</sup> In (5b), Hill & Black (1998:866) state that /v/ cannot complete a syllable and will change to /p/.

<sup>4</sup> Hill & Black (1998) show that plural objects can be reduplicated and also appear with the perfective suffix, *-ta*, or the plural form of this suffix, *-tota*. Some plural objects can be marked with both reduplication and a suffix or just a suffix. Further research is needed regarding reduplication and aspect in Hopi.

*If Verbal Number is Lo-Low...*

HMO (2002) note that reduplication does not just mark plural arguments as it can also signify plural events. They argue that what appears to be participant number may best be described as verbal number (or, iterative aspect as HMO refer to it). Veselinova (2006) and Corbett (2000) note that verbal number is composed of both event number, which marks plural events, and participant number, which marks plural internal arguments. Thus, reduplication appears to mark verbal number in Niuean. (10) shows reduplication marking a plural event with a singular object.

- (10) a. Ne noko e ia e gutuhala  
PAST knock ABS she ABS door  
'She knocked on the door (probably once but not necessarily).'
- b. Ne **nokonoko** e ia e gutuhala  
PAST knock.RD ABS she ABS door  
'She knocked on the door (many times).'
- (HMO 2002:483)

Hence, in Niuean, reduplication marks plurality of events, plurality of arguments, or both.

### 2.3.2. Hiaki Reduplication

Like Niuean, Hiaki also has verbal reduplication, which marks plural arguments in the same pattern as verbal suppletion as well as habitual, emphasis, and progressive (Harley & Leyva 2009). Hiaki reduplication surfaces as *CV-*, *CVC-*, *CVCV-*, *CVG-* (gemination of following consonant), and medial consonant gemination.<sup>5</sup> (11) requires reduplication to mark a plural argument.

- (11) a. Aapo/\*Vempo koche                      b. Vempo **ko**-koche  
3SG/\*3PL                      sleep                      3PL                      RED-sleep  
'He is sleeping' / \*'They're sleeping'                      'They're sleeping'
- (Harley & Leyva 2009: 254)

In (11a), the singular subject may occur with the unreduplicated verb, but the plural subject may not. In (11b), the plural subject is grammatical when the verb is reduplicated.

Like Niuean, Hiaki reduplication may also occur when the internal argument is singular, but the event is plural. In (12), reduplication marks a habitual event, but the subject is singular.<sup>6</sup>

- (12) Nee hiva                      woh mamnim-po                      tukaa-po                      **kok**-koche  
1SG                      always                      two                      five-at                      night-at                      RED-sleep  
'I always go to sleep at 10 PM.'
- (Harley & Leyva 2009: 262)

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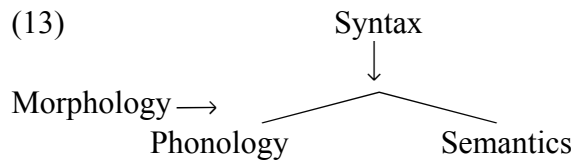
<sup>5</sup> Harley & Leyva (2009) note that the form of reduplication is idiosyncratically linked to the verb and cannot be described in a systematic way.

<sup>6</sup> Harley & Leyva (2009) also note that when the reduplication and gemination form is used as in (12), there is no additional reduplication to mark the plural argument.

Separate analyses for participant number by reduplication (HMO 2002) and by suppletion (Bobaljik & Harley to appear) can be unified if both processes are triggered by the same node. I will argue that this node codes plurality of arguments and events.

### 3. A Local Analysis

This analysis is couched in the framework of Distributed Morphology (DM) (Halle & Marantz 1993). In DM, it is assumed that the syntactic derivation occurs prior to insertion of Vocabulary Items. In (13), I give the DM-model, which shows syntax all the way down.



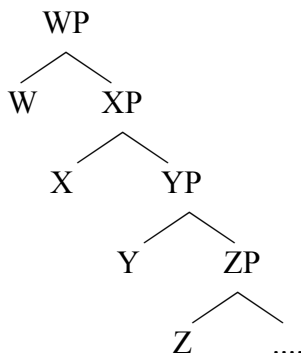
In DM, morphemes are features distributed by syntax on head nodes. After the syntactic derivation, there is late insertion of Vocabulary Items, which are the phonological realizations of morphemes at Morphological Structure (MS)—the interface between Syntax and PF. After Vocabulary Insertion, phonological rules may apply for phonological well-formedness.

#### 3.1 Locality and Morphological Domains

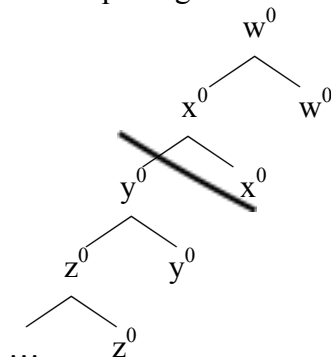
I assume that there are domains within a word that act as boundaries that block phonological interactions. I also assume that roots are category-less until they combine with a category-defining head, and it is these category-defining heads which delineate domains (Marantz 2001, 2007; Embick 2010). Embick (2010) argues that category-defining heads act like phase heads in syntax as defined in Chomsky (2001). The category-defining head “spells out” its sister by triggering Vocabulary Insertion within this complex head. During VI, a Vocabulary Item is inserted, realizing the phonological form of the abstract morphemes, which were concatenated in the syntax.

In (14), I provide two structures. (14a) is the syntactic structure prior to head movement, and (14b) is the morphological structure after head movement has formed a morphological word.

(14) a. syntactic structure



b. morphological structure



*If Verbal Number is Lo-Low...*

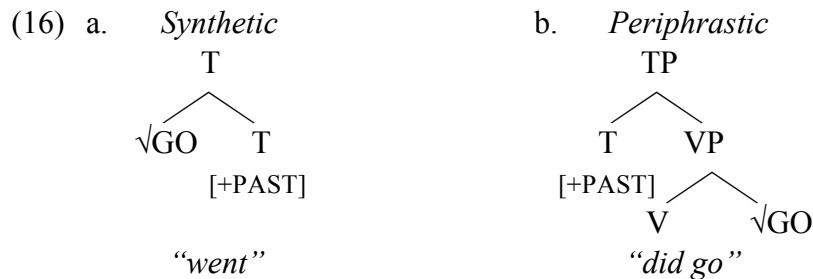
If  $x^0$  is the head of a morphological domain in (14b), it triggers VI of  $y^0$  and  $z^0$ . After this occurs,  $y^0$  and  $z^0$  can no longer be phonologically affected by higher affixes which are outside of the morphological domain delineated by  $x^0$ .<sup>7</sup>

Following Bobaljik (2012), I also assume that suppletion is strictly local. Bobaljik (2012) argues that the root and its trigger for suppletion must be within the same morphological word. In (15), I give his locality condition on suppletion:

- (15) Locality  
 $\beta$  may condition  $\alpha$  in (a), not (b):  
 a.  $\alpha \dots ]x^0 \dots \beta$   
 b.  $*\alpha \dots ]XP \dots \beta$

(15a) states that if both  $\alpha$  and  $\beta$  are within the same word,  $\beta$  may condition  $\alpha$ , whereas (15b) states that if a maximal projection intervenes,  $\beta$  cannot condition  $\alpha$ . Hence, a head node may trigger suppletion within a morphological word, but a head node may not condition suppletion in a separate morphological word.

An example of this can be seen with the past tense of *go* in English. In (16), I provide the structure for the synthetic and periphrastic constructions. (16a) is the synthetic construction after the root has combined with the Tense head, which yields the word, *went*. (16b) is the periphrastic construction where the root and Tense are separated by the phrasal projection, VP.



In (16b), a phrasal projection intervenes between the root and T, which yields two separate words. The root is realized as *go*, and since T is in a separate morphological word, it is realized as *did*. This is in contrast to (16a) where T and the root are in the same morphological word after head movement in the syntax. T is then able to condition root suppletion, yielding, *went*.

Consider again structure (14). In structure (14a), none of the head nodes may condition each other as a phrasal projection intervenes between each one. In (14b), on the other hand, all nodes are able to affect each other as no maximal projection intervenes, yielding one morphological word. However, there is also a morphological domain boundary delineated by the head,  $x^0$ .

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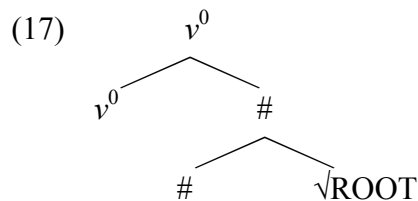
<sup>7</sup> For ease of exposition, this slightly simplifies Embick's proposal, which allows for interactions across one—but not two—phasal nodes by the mechanism of pruning. For example, in (16a), if  $v^0$  is deleted, it no longer serves as an intervener between the root and higher head, which thus, allows T and the root to be in a local relationship.

As indicated by the line,  $x^0$  blocks heads higher than the vocabulary-insertion domain (i.e.  $x^0$  and  $w^0$ ) from interacting with Vocabulary Items which have already been inserted at  $y^0$  and  $z^0$ .

Root-affecting morphology, therefore, must be low with respect to the morphological domain. If both reduplication and suppletion mark verbal number, then a number node which marks plural arguments and events must be within the verbal word. This number node must also be internal to the morphological domain which contains the root in order to be root-affecting.

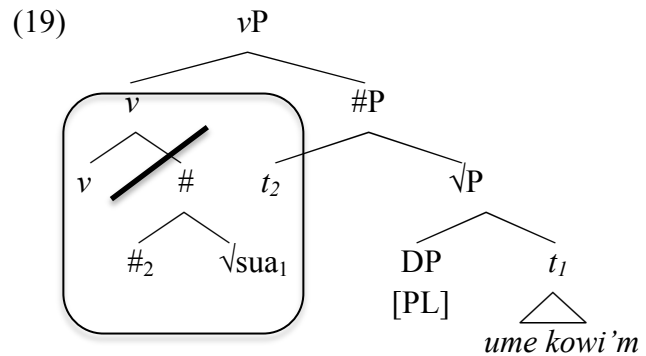
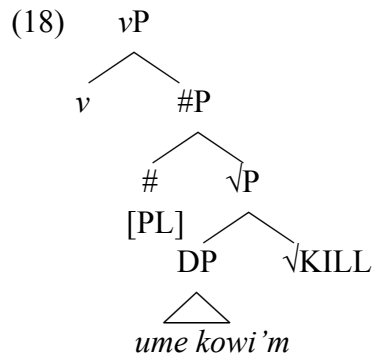
### 3.2 Number-Number

I propose that plurality of arguments and events are marked at a verbal number node as in (17).



In this structure, there is a head which dominates the root and codes plural arguments and events. I will refer to this as a number node and will focus on the morphophonological effects of Vocabulary Items which are inserted at this node.

A derivation is as follows. First, syntactic operations occur before VI at MS. The syntactic structure in (18) is built, and then, a [PL] feature is inserted on the #-node as it c-commands the plural internal argument. Since the internal argument is local to the domain containing root and number, the plural features are inserted at the #-node in the syntax. This maintains Bobaljik & Harley's view that only internal arguments may govern suppletion (and reduplication).



(19) is the structure after head movement has occurred and formed a complex word within the syntactic structure. Movement of the root-and-number complex to the domain head,  $v$ , triggers VI of its complement. VI proceeds root-outward (Bobaljik 2000), and the number node is realized as either reduplication or suppletion. The plural allomorph of the root is then inserted (20a):



*If Verbal Number is Lo-Low...*

- (20) a.  $\sqrt{\text{KILL}}$                     ---> sua / \_\_\_\_\_#[PL]  
       b.  $\sqrt{\text{KILL}}$                     ---> me'a /

The bare root in (19) and (20a) receives its phonological form—the plural allomorph—because it is in the context of number which is specified with a plural feature. The features on the #-node are able to affect the form of the root as it is inside of the morphological domain.

#### 4. Morphophonological Effects

Since high affixes that can phonologically affect the root are limited (Embick 2010), the head which realizes verbal number must be low and close to the root. In section 2, I have provided evidence for a vP-internal #-node which is able to mark plurality of arguments and events. Then, in section 3, I provided evidence for the locality of this node. Next, I will show that Hiaki reduplication further supports the hypothesis that this node must be domain-internal.

##### 4.1 Root-Affecting RED in Hiaki

Hiaki provides further morphophonological evidence for the locality of this #-node. As described in section 2.3.2, Hiaki has reduplication which is able to mark plural arguments as well as habitual events and progressive events. One form of reduplication in Hiaki is Medial C GEM, where a consonant internal to the root is geminated.<sup>8</sup> The examples in (21) are all of Medial C GEM, and every example (with the exception of (21d)) marks plural events.

- |         |          |           |   |                       |
|---------|----------|-----------|---|-----------------------|
| (21) a. | hahame   | hahhame   | ‘catch up’                                      |                       |
| b.      | hima     | himma     | ‘toss, discard, divorce, leave (behind), throw’ |                       |
| c.      | kakae    | kakkae    | ‘be sweet’                                      |                       |
| d.      | koko     | kokko     | ‘dying (PL)’                                    |                       |
| e.      | maveta   | mavveta   | ‘receive, accept’                               |                       |
| f.      | kapoonte | kappoonte | ‘castrate’                                      | (Harley & Leyva 2009) |

Example (21d) marks plural internal arguments by Medial C GEM. I will next provide a derivation with a reduplication affix specified for Medial C GEM using example (21d).

In (22), I give the morphological structure after the syntactic derivation where a [PL] feature is specified on #. (22a) shows the morphological complex formed during head movement where the root is in its bare form and # is specified with a [PL] feature. (22b) is the structure after moving to  $v^0$ , which triggers VI of the phonological form of the root and [RED].

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<sup>8</sup> Harley & Leyva (2009) note that this occurs most often with non-coronal consonants, but there is no clear morphophonological property for this.

Abigail Thornton



In (22b), the root receives its phonological form, *koko*, and a [RED] affix, which will copy from the root, is inserted at #. The Vocabulary Insertion derivation is given in (23).

(23) a.	[√ koko]	V.I. @ √
b.	[# RED [√ koko]]	V.I. @ #
c.	[v <sup>o</sup> [# [√ kokko]]]	Resyllabification: Gemination

In this derivation, the root is inserted in (23a), and VI of a [RED] affix at # occurs in (23b). [RED] is then syllabified internal to the root in (23c). Here, gemination of the medial consonant, *k*, occurs during resyllabification, yielding *kokko*. [RED] is able to affect the root because it is low, and thus, it is able to phonologically affect the root by both suppletion *and* reduplication.

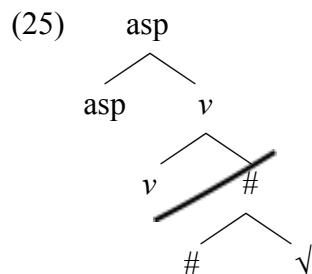
#### 4.2. Progressives in Hiaki

Furthermore, Harley & Leyva (2009:254) note that, in their corpus, Medial C GEM never occurs to mark the progressive aspect. (24) is an example of reduplication marking the progressive aspect where the action being performed is currently in progression.

(24) Uu	hamut	totoi	kava-m	<b>bwa-bwaata</b>
	the woman	chicken	egg-PL	RED-stir

*'The woman is mixing the porridge.'*

I assume that Medial C GEM never marks the progressive as it is marked higher than verbal number in an aspect projection. (25) shows that aspect is outside of the morphological domain and dominates *v*.



*If Verbal Number is Lo-Low...*

If reduplication is specified on a head higher than the morphological domain, it should be unable to phonologically affect the form of the root as VI has already occurred in the lower domain.

As noted by Corbett (2005), there is a difference between Aspect and verbal number. Verbal number marks both plural events and plural internal arguments whereas Aspect only marks events. Further evidence that Aspect is separate from verbal number is that in languages with both verbal number and Aspect, the latter is marked higher. This can be seen in Mandara, a Chadic language, which marks both participant number and perfective aspect with reduplication.

- |         |                    |           |
|---------|--------------------|-----------|
| (26) a. | wá-wà              | gigálè    |
|         | shoot-PERF         | rat       |
|         | '3sg shot a rat.'  |           |
| b.      | wá-rú-wà           | gigálè    |
|         | shoot-PL-PERF      | rat       |
|         | 'They shot a rat.' |           |
| c.      | wa-wá-wàwà         | gigálà-xà |
|         | #-shoot-PERF       | rat-PL    |
|         | '3sg shot rats.'   |           |
| d.      | wà-wá-r-wàwá       | gigálà-xà |
|         | #-shoot-PL-PERF    | rat-PL    |
|         | 'They shot rats.'  |           |

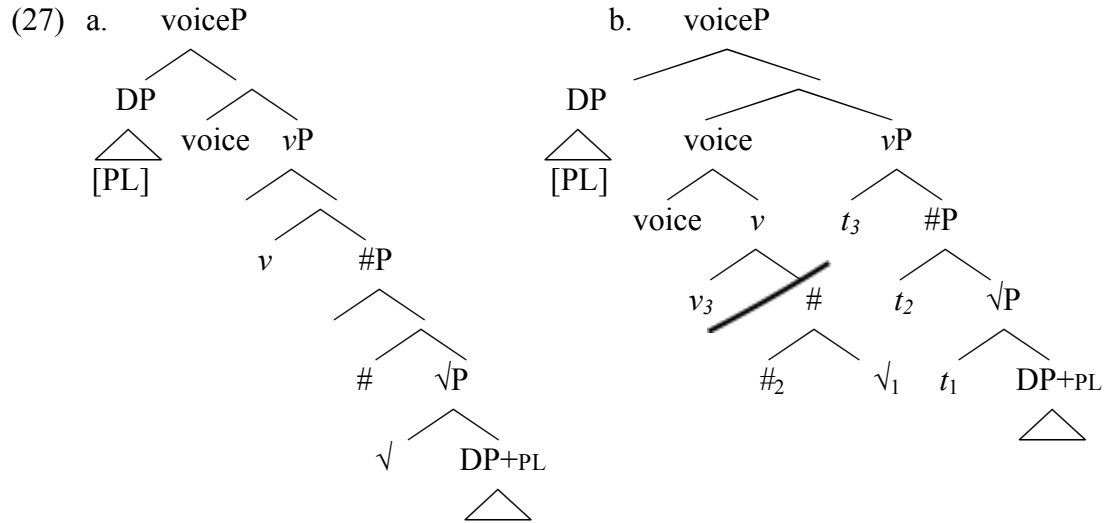
(Frajzyngier 1984)

Mandara is a language which marks plural subjects with *-r* in a nominative-accusative pattern as in (26b) and (26d). It also marks plural internal arguments by prefixal reduplication, which can be seen in (26c) and (26d), and only copies the verbal root. Finally, Mandara marks the perfective aspect with reduplication, which is demonstrated in all of these examples. Further evidence that aspect must be higher than verbal number are (26c) and (26d). Here, reduplication for perfective aspect copies the whole morphological complex in the lower domain. That is, reduplication for perfective aspect copies not only the root but also the reduplicated form of the root which marks participant number.

I propose that in Hiaki, Medial C GEM cannot occur to mark aspect as it is outside of the category-defining domain. Therefore, a reduplication affix on the aspect head is too high to phonologically affect the root's form. If progressive was lower, it could also trigger Medial C GEM.

## 5. Implications

A final implication of this analysis is that external arguments cannot be realized on the #-node. External arguments originate in the specifier position of vP or voiceP, and interaction with the root is blocked by the morphological domain head, v. (27a) is the syntactic structure prior to head movement, and (27b) contains the morphological structure after head movement has occurred.



If a plural feature is specified on the external argument, it cannot be realized in the lower morphological domain as VI has already occurred. Morphophonological interactions between the external argument and the root, therefore, are blocked by  $v^0$  as indicated by the line in (27b). Hence, the plural features of the external argument should be realized in the higher domain either as agreement on the verb or on  $voice^0$ . The plural internal argument is able to be marked on the verb as it is contained internal to the category-defining domain, and it is the domain-defining head which blocks the plural external argument from being realized on the root.

## 6. Conclusion

In conclusion, I have shown that (i) the Hiaki facts do not motivate a word-external trigger for root suppletion and (ii) parallels between reduplication and suppletion provide evidence for a #-node which marks plural arguments and events. I have argued that this node is internal to the  $vP$ -domain as suppletion and root-affecting reduplication provide morphophonological evidence that this #-node is low in the structure. Bobaljik & Harley's analysis cannot be maintained, because participant number is not just marked on the root but can also be marked by an affix. I have shown that verbal plurals are marked at a verb-internal #-node which can be realized as reduplication or suppletion, and suppletion is triggered by this node when c-commanding a plural internal argument. Finally, reduplication can also be root-affecting due to locality of this node. Thus, a stricter locality condition than Bobaljik & Harley's proposal can be maintained.

## References

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*If Verbal Number is Lo-Low...*

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