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Reduplication, repetition and sound symbolism in Fungwa

Samuel Kayode Akinbo*

University of British Columbia – sakinbo@umn.edu

A pattern of reduplication marks the intensity of evaluatives in Fungwa. CV syllables of nominal roots and CV prefixes can be reduplicated, but V syllables cannot. The intensity marker, which also has a CV shape due to an onset condition, can be multiply repeated. The reduplicative intensifier and its repetition(s) are akin to arbitrary affixes in the language in terms of their phonological characteristics, and they are also consistent with non-arbitrary sound-meaning mapping across languages. Formally, the repetition and shape of the reduplicant are considered to be effects of morphosyntax and markedness constraints. Considering that the evaluative marker and the intensifier are consistent with patterns of sound symbolism, Fungwa presents categorical evidence for the perspective that sound-meaning mapping involves both arbitrariness and non-arbitratriness.

Keywords: reduplication; sound symbolism; intensifier; diminutive; augmentative

1 Introduction

This paper focuses on the description and phonological analysis of reduplication in Fungwa (Kainji, Benue-Congo), which is an endangered language spoken in Nigeria. In the language, the notions of smallness and bigness are expressed by fronting and backing non-high vowels of nominal roots, as in (1a). In this case, the degree of smallness and bigness may be intensified via reduplication, as seen in (1b). To increase the degree of intensity, the reduplicant can be multiply repeated (1c-d). The exclamation "!" indicates each iteration.

(1) Evaluative morphology in Fungwa

	'N'	'small N'	'big N'	
a.	télà	télɛ̀	tólà	'tailor(s)'
b.		**tì**télɛ̀	**tù**tólà	'**very** small/big tailor(s)'
c.		**tìtì**télɛ̀	**tùtù**tólà	'**very!** small/big tailor(s)'
d.		**tìtìtì**télɛ̀	**tùtùtù**tólà	'**very!!** small/big tailor(s)'

Akinbo (2021a) analyses the root-vowel mutation as an effect of diminutive and augmentative morphemes, which are categories of evaluative morphology (Déchaine, Girard, Mudzingwa & Wiltschko 2014). Considering that the intensification is only possible in a noun that has undergone diminutive or augmentative

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formation, my account is that reduplicant serves to intensify the quality of diminutiveness/augmentedness, rather than any feature of the noun (see §4). The monosyllabic shape and prefixal properties of the reduplicant are considered an effect of its morphological classification as an affix. That the reduplicant has an onset is considered the effect of an onset condition (see §5). Segmental and tonal properties of the reduplicant are analysed as the effect of markedness constraints on tone and vocalic segments (McCarthy & Prince 1994a; Howe & Pulleyblank 2004).

That the intensifier is a reduplicant and can be multiply repeated is consistent with non-arbitrary sound-meaning mapping across languages (Dingemanse 2015; Ibarretxe-Antuñano 2017), challenging the long-standing view that sound-meaning mapping is completely arbitrary (Hockett 1960; de Saussure 1974). By observing the parallel between arbitrary and non-arbitrary sound-meaning mapping, recent studies argue for the integration of non-arbitrary sound-meaning mapping into core grammar (Yip 1999; Alderete & Kochetov 2017; Kawahara 2020; Akinbo 2021a). In this work, I show that there is a parallel between arbitrary phonological patterns and non-arbitrary reduplication in Fungwa. I also show that traditional constraints, such as MAX-BR (McCarthy & Prince 1993, 1995), can account for non-arbitrary patterns of reduplication like Fungwa. As a background to the discussion on the reduplicative pattern, §2 presents the noun-class prefixes and the basic sound inventory of the language. The summary and conclusion are presented in §6.

2 Language background

2.1 N-class prefixes and number marking

A bare noun in Fungwa can have singular and plural interpretations but can optionally be marked for singular, plural or mass with a noun-class prefix. The number-marking prefix on a noun depends on the class of the noun. Fungwa has nine noun classes which are grouped into five sets based on their pairing in number marking. As presented in Table 1, the numbering of the class prefixes in Fungwa is based on the proposed class-prefix numbering system in works on Proto-Kainji, Proto-Benue-Congo and other Kainji languages (Gerhardt 1989; Williamson 1989).

Table 1: Noun-class prefixes and number marking in Fungwa

Number Marking	Class	Examples	
N		wójì̀	‘man/men’
SG-N	1	**bù**-wójì̀	‘man’
PL-N	2	**à**-wójì̀	‘men’
N		jíʃò	‘eye(s)’
SG-N	5	**nī̀**-jíʃò	‘eye’
PL-N	6	**á**-jíʃò	‘eyes’
N		tʃáʔà̰	‘saliva’
MASS-N	6a	**mū̀**-tʃáʔà̰	‘saliva’
N		ʃíjè	‘waist(s) ’
SG-N	9	**bí**-ʃíjè	‘waist’
PL-N	10	**ń**-ʃíjè	‘waists’
N		jɛ́ːtù	‘tongue(s)’
SG-N	11	**í**-jɛ́ːtù	‘tongue’
PL-N	13	**tʃí**-jɛ́ːtù	‘tongues’

Phonologically, a noun-class prefix can have the shape CV, V or N. The vowels of the CV prefixes agree in backness with the vowel of an adjacent root syllable. This alternation is discussed in §2.2. CV prefixes contain only the vowels [i u], and V prefixes are either /i/ or /a/. As we will see in §5.2, the vowels of the CV prefixes are crucial to the account of the intensifier.

2.2 Sound Inventory: Tone and vowels

Fungwa contrasts two tones, H(igh) [bá] 'that' and L(ow) [bà] 'you'. Except for one CV-shaped prefix with an invariant L tone, all the CV-shaped prefixes in Fungwa bear the same tone as the following tone-bearing unit (TBU), as illustrated in (2a). The only syllabic nasal prefix also bears the same tone as the following TBU. All the V-shaped prefixes have invariant tone, as illustrated in (2b).

(2) Tone assimilation and root-controlled harmony

a.	C5-root		C5-root	
	bǐ-píʔì̗	'he-goat'	**bù**-gùlú	'vulture'
	bǐ-gɛ́tɛ̀	'heart'	**bú**-báʔà	'child'
	bǐ-télà	'tailor'	**bú**-lúgɛ̀	'rope'
b.	C11-root		C11-root	
	í-jíjɛ̀	'goat'	**í**-tàpí	'sole'
	í-jégɛ̀	'fish'	**í**-dɛ̀nǐ	'fence'
	í-jɛ́ːtù	'tongue'	**í**-ʃàkó	'big marijuana'

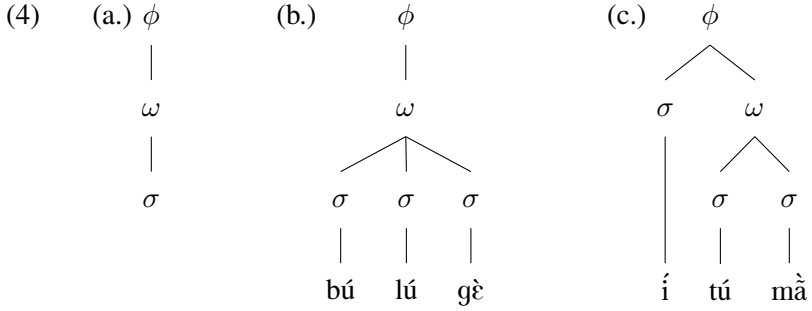
(3) Oral vowels

Front:	i	e	ɛ	
Back:	u	o	ɔ	a

The vowel inventory in Fungwa contains seven oral vowels, as shown in (3). All the vowels have nasal and long counterparts. In addition, Fungwa has nine rising diphthongs (see Akinbo 2021b). The vowels can be grouped into front and back based on their phonetic properties and phonological distribution in vowel harmony, which involves the feature [αback]. In this case, the vowels of CV prefixes alternate to agree in backness with the vowel of the adjacent root syllable as shown in (2a), but the vowels of V prefixes do not as shown in (2b).

That the prefix vowel agrees in backness with the vowel of the following root syllable is a form of root-controlled harmony (Clements 1985a,b). Akinbo (2019, 2021b) argues that, in Fungwa, the prosodic word (ω) is the domain of backness harmony and an onset requirement on a syllable (see Itô & Mester 1999). A simplified version of the prosodic structure is shown in (4a). The structure is based on the uniform version of the prosodic hierarchy (Selkirk 1986, 2011). The constituents of ω, namely Foot (F) and Mora (μ), are not relevant to this work. As shown in (4), the V prefix is directly attached to a prosodic phrase (ϕ) not ω. See §5.6 for an additional evidence in support of this postulation.

(4)



According to Akinbo (2019, 2021b), the CV prefixes are integrated into ω, which is projected by a root morpheme (4b). In order to satisfy the onset requirement, the V prefixes are misaligned with ω (4c). The reason the V prefixes do not undergo harmony is because they are not integrated into ω. As we will see, the onset condition and front-back grouping of vowels play a role in the properties of the reduplicant. This is an example of P>>M: a phonological factor taking precedence over the morphology, analogous to the *-um-* infixation in Tagalog (see McCarthy & Prince 1993).

3 The convergence of vowel mutation and reduplication

The main goal of this section is to describe a pattern of reduplication in Fungwa. Because reduplication is only possible with a form that has undergone root-vowel backing or fronting, this section also describes the root-vowel mutation.

3.1 Root-vowel mutation: Diminutive and augmentative formation

Fungwa can optionally express the notion of smallness by fronting non-high vowels of nominal roots. To mark the notion of bigness, the language backs non-high vowels of nominal roots. Based on the meaning associated with the fronting and backing, they are respectively described as diminutive and augmentative.

(5) Mutation of neutral roots with [αback]...[αback] vowel sequence

	'N'	'small N'	'big N'		
	N	DIM.N	AUG.N		
a.	géjɛ̀	géjɛ̀	gójɔ̀	'bean'	
	gɛ́tɛ̀	gɛ́tɛ̀	gátà	'heart'	(∼ gɔ́tɔ̀)
	ʃɔ̃̀bó	ʃɛ̃̀bé	ʃà̃bó	'chilli pepper'	(∼ ʃɔ̃̀bó)
	gáwà	gɛ́wɛ̀	gáwà	'jaw'	(∼ gɔ́wɔ̀)
b.	wő́jɛ̃̀	wɛ̋́jɛ̃̀	wő́jɔ̃̀	'housefly'	
	télà	télɛ̀	tólà	'tailor'	(∼ tólɔ̀)

In the diminutive formation, the root vowel [o] is realised as [e] and vice versa in the augmentative formation. [ɔ, a] are realised as [ɛ] in the diminutive formation. However, in the augmentative formation, [ɛ] and [ɔ] are generally realised as [a] but can optionally be realised as [ɔ]. The optional realisation is not relevant here. See Akinbo (2021b) for details. Neutral roots (i.e. roots without diminutive and augmentative formation) with only front or back vowels create surface ambiguity, as shown in (5a). If the neutral nominal root has a sequence of [−back]...[+back] or [+back]...[−back] vowels, the mutations produce a sequence that is uniformly front or uniformly back, as shown in (5b).

High vowels and consonants in the root are generally invariant even when non-high vowels show backing or fronting, as shown in (6). However, a few exceptional cases of high vowels and consonants, such as the examples in (7), undergo root-vowel mutation.

(6) Evaluative formations: High vowels in root-vowel mutation

'N'	'small N'	'big N'	
N	DIM.N	AUG.N	
tʃí̀nɛ̀	tʃí̀nɛ̀	tʃí̀nɔ̀	'forehead'
vúnà̃	vúnɛ̃̀	vúnà̃	'leg'
bɛ̀kútɛ̀	bɛ̀kútɛ̀	bàkútà	'armpit'
bɛ̀tʃí̀gɛ̀	bɛ̀tʃí̀gɛ̀	bàtʃí̀gà	'rib'
gúgù	gúgù	gúgù	'bark of a tree'
bì̀sì̀kí̀	bì̀sì̀kí̀	bì̀sì̀kí̀	'biscuit'

(7) Varying high vowels and consonants in evaluative formations

	'N'	'small N'	'big N'	
	N	DIM.N	AUG.N	
a.	dʒ́ítʃè	dʒ́ítʃè	dútò	'ours'
b.	dúà/dâː	dʒ́íɛ̀/dʒɛ̂ː	dúà/dâː	'yours'
c.	wɔ́kù	jɛ́kù	wɔ́kù	'river'
d.	nʊ́mɛ̀	nɪ́mɛ̀	nʊ́mà	'iron'

The consonants [dʒ] and [tʃ] are realised as [d] and [t] respectively in the augmentative formation (7a), and vice versa for [d] in the diminutive formation (7b). In the diminutive formation, the consonant [w] is realised as [j], as shown in (7c). The consonants [tʃ, dʒ] are contrastive in all environments, so the consonant alternation in (7) cannot be considered the effect of the high vowels, but diminutive and augmentative formation. In line with Akinbo (2021a), the high-vowel mutation and (de)palatalisation are considered exceptions because they only apply to a small fraction of words in the language, such as the possessive pronouns.

As argued in Akinbo (2021a,b), root-vowel fronting is the effect of a diminutive affix, which has a [−back] feature as its exponent. As for root-vowel backing, it is the effect of an augmentative affix, which has a [+back] feature as its exponent. Structurally, they are adjoined to a nominal root. The expression of smallness with root-vowel fronting and bigness with root-vowel backing is grammaticalised evidence for crosslinguistic patterns of sound symbolism (Sapir 1929; Awoyale 1981; Dingemanse 2015). While patterns of palatalisation, such as the exceptional cases in (7b), also express diminutives crosslinguistically (Alderete & Kochetov 2017), expressive depalatalisations like (7a) are rare but consistent with sound symbolism (see Ohala 1994). In §4.2, I show that sound symbolism in Fungwa is not limited to the pattern of root-vowel mutation.

I now turn to the main focus of this work, which is a pattern of reduplication that interacts with the diminutive and augmentative formation.

3.2 Reduplication of nominal stems

Reduplication marks the intensity of the diminutive and augmentative forms. The reduplicant can be multiply iterated. The exclamation "!" indicates each iteration. To show the extent of the reduplication in the basic pattern, an exceptional case of high-vowel mutation, in this case [nʊ́mɛ̀] 'iron', is included in (8).

(8) Intensity of diminutive and augmentative formation

a.	'N'	'small N'	'**very** small N'	'**very**! small N'	
	N	DIM.N	**INT**-DIM.N	**INT!**-DIM.N	
	nʊ́mɛ̀	nɪ́mɛ̀	**nɪ̀**nɪ́mɛ̀	**nɪ̀nɪ̀**nɪ́mɛ̀	'iron'
	pèlé	pèlé	**pì**pèlé	**pìpì**pèlé	'cap'
	télà	télɛ̀	**tì**télɛ̀	**tìtì**télɛ̀	'tailor'
	gétɛ̀	gétɛ̀	**gì**gétɛ̀	**gìgì**gétɛ̀	'heart'
b.	'N'	'big N'	'**very** big N'	'**very**! big N'	
	N	AUG.N	**INT**-AUG.N	**INT!**-AUG.N	
	nʊ́mɛ̀	nʊ́mà	**nʊ̀**nʊ́mà	**nʊ̀nʊ̀**nʊ́mà	'iron'
	pèlé	pòló	**pù**pòló	**pùpù**pòló	'cap'
	télà	tólà	**tù**tólà	**tùtù**tólà	'tailor'
	gétɛ̀	gátà	**gù**gátà	**gùgù**gátà	'heart'

As shown in (8), the reduplicant is a CV syllable, where the C is a copy of the initial consonant of the base and the V is [i] when the base-initial vowel is front but [u] when the base-initial vowel is back.

No matter the tone of the base, the reduplicant consistently bears a L tone, except in cases with prefix reduplication (see §3.3).

To mark the intensity of the augmentative and diminutive on a stem with a syllable-initial invariant high vowel, as in (9), the vowel of the reduplicant is [i] or [u] depending on the backness of the following vowel, not the root-vowel mutation.

(9) Invariant high vowels: Intensity of diminutive and augmentative formation

a.	'N'	'big N'	'**very** big N'	'**very**! big N'	
	N	AUG.N	**INT**-AUG.N	**INT!**-AUG.N	
	kítè	kítò	**kì**kítò	**kì kì**kítò	'hairstyle'
	kítɛ̀	kítà	**kì**kítà	**kì kì**kítà	'cockroach'
	gùfó	gùfó	**gù**gùfó	**gù gù**gùfó	'traditional mat'
	túmā́	túmā́	**tù**túmā́	**tù tù**túmā́	'clay'
b.	'N'	'small N'	'**very** small N'	'**very**! small N'	
	N	DIM.N	**INT**-DIM.N	**INT!**-DIM.N	
	kítè	kítè	**kì**kítè	**kì kì**kítè	'hairstyle'
	kítɛ̀	kítɛ̀	**kì**kítɛ̀	**kì kì**kítɛ̀	'cockroach'
	gùfó	gùfé	**gù**gùfé	**gù gù**gùfé	'traditional mat'
	túmā́	túmɛ̄́	**tù**túmɛ̄́	**tù tù**túmɛ̄́	'clay'

The example sets from (8) and (9) show the reduplicant can be doubly iterated, but as shown in (10), the reduplicant actually can be iterated as long as the speaker wishes. The star after the gloss (int*), as in (10) and (11), is a Kleene star, which represents one or more iterations of the intensifier.

(10) Intensity of diminutive and augmentative for /gɛ́tɛ̀/ 'heart'

	'(X*) big heart'	'(X*) small heart'
	(**INT***-)AUG.N	(**INT***-)DIM.N
-	gátà	gɛ́tɛ̀
'**very**'	**gù**gátà	**gì**gɛ́tɛ̀
'**very**!'	**gù gù**gátà	**gì gì**gɛ́tɛ̀
'**very**!!'	**gù gù gù**gátà	**gì gì gì**gɛ́tɛ̀
'**very**!!!'	**gù gù gù gù**gátà	**gì gì gì gì**gɛ́tɛ̀

A reduplicated form can bear a noun-class prefix. Consider the examples in (11).

(11) Intensity of diminutive and augmentative for /gɛ́tɛ̀/ 'heart'

	'(X*) big heart'	'(X*) small heart'
	(**INT***-)C9-AUG.N	(**INT***-)C9-DIM.N
-	bú-gátà	bɪ́-gɛ́tɛ̀
'**very**'	bù-**gù**gátà	bɪ̀-**gì**gɛ́tɛ̀
'**very**!'	bù-**gù gù**gátà	bɪ̀-**gì gì**gɛ́tɛ̀

The discussion in this section has mainly focused on the reduplication of nominal roots, regardless of whether the nominal roots bear a prefix or not. In the next section, I show that the CV prefixes can also reduplicated.

3.3 Reduplicating CV prefixes

Based on their tones, the Fungwa prefixes in Table 1 fall into two groups. The first group bears the same tone as the following TBU as in (12a), while the tones of the second group are invariant regardless of the tone of the following TBU as in (12b).

(12) Tones of C9 and C1 prefixes

a.	C9	**bǐ**-gɛ́tɛ̀	'heart'	**bì**-dèdú	'old woman'
		bú-báʔà	'child'	**bù**-kùdó	'bed'
b.	C1	**bì**-téʃì	'seller	**bù**-gùàʔátʃì	'dwarf'
		bù-mű́ʔů	'taker'	**bì**-pèʔé	'giver'

The intensification can also be marked by reduplicating CV prefixes, as shown in (13).[1] As seen in the preceding section, the intensifier in root reduplication consistently bears a L tone, but the CV prefixes and their reduplicants X* bear the same tone, as in (13–14).

(13) Intensity of evaluative for [bǐ-gɛ́tɛ̀] 'heart'

	'(**X***) big heart'	'(**X***) small heart'
	(**INT**-)C9-AUG.N	(**INT**-)C9-DIM.N
	bú-gátà	bǐ-gɛ́tɛ̀
'**very**'	**bú**bú-gátà	**bǐ**bǐ-gɛ́tɛ̀
'**very**!'	**búbú**bú-gátà	**bǐbǐ**bǐ-gɛ́tɛ̀
'**very**!!'	**búbúbú**bú-gátà	**bǐbǐbǐ**bǐ-gɛ́tɛ̀

(14) Intensity of evaluative for [bù-tʃàké] 'marijuana'

	'(**X***) big marijuana'	'(**X***) small marijuana'
	(**INT**-)C9-AUG.N	(**INT**-)C9-DIM.N
	bù-tʃàkó	bì-tʃɛ̀ké
'**very**'	**bù**bù-tʃàkó	**bì**bì-tʃɛ̀ké
'**very**!'	**bùbù**bù-tʃàkó	**bìbì**bì-tʃɛ̀ké
'**very**!!'	**bùbùbù**bù-tʃàkó	**bìbìbì**bì-tʃɛ̀ké

The V prefixes, unlike the CV prefixes, cannot undergo reduplication, but they can occur as the prefix of a reduplicated stem, as seen in (15).

(15) Intensity of augmentative for [ǐ-pɛ́là] 'wind'

	'X big wind'	'X big wind'
	(*INT-)C11-AUG.N	(*INT-)C11-AUG.N
	ǐ-pálà	ǐ-**pù**pálà
'**very**'	*ì**ǐ**-pálà	ǐ-**pù**pálà

No native Fungwa words are vowel-initial. The intensifier cannot appear both inside and outside the noun class prefix simultaneously (e.g., *[bìbì-gìgɛ́tɛ̀] for [bì-gìgìgɛ́tɛ̀] 'very very small heart') .

[1] All instances of prefix reduplication in this work were collected in an elicitation context.

3.4 Generalisations: Reduplication

The generalisations listed below summarise the crucial properties of the Fungwa reduplication.

i. The intensity of the diminutive and augmentative is marked with a partial reduplication.
ii. The reduplicant is a CV syllable, where C is a copy of the first consonant of the base.
iii. V is [i] when the following base vowel is front but [u] when the following base vowel is back.
iv. The reduplicant bears L tone when the base of reduplication is a nominal stem.
v. The reduplicant can be multiply iterated.
vi The intensity can also be marked by reduplicating CV noun-class prefixes.
vii Reduplicants of CV noun-class prefixes share the tone of the prefix.
viii. The V prefixes (unlike the CV prefixes) are not targeted for reduplication.

4 Syntactic analysis and sound-meaning mapping

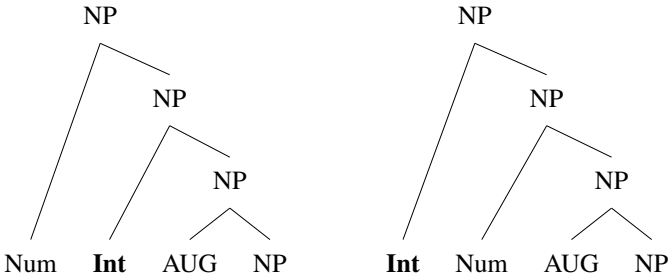
4.1 Intensification as degree marking of evaluatives: very* SMALL/BIG

In this section, I present a syntactic account of the intensifier. My proposal is that the intensifier in Fungwa is a modifier, which is comparable to degree adverbs. Crosslinguistically, the realisation of adverbs in a syntactic structure is treated either via an adjunction approach (Potsdam 1998; Abeillé & Godard 2003; Haumann 2007) or a specifier approach (Jackendoff 1972; Kayne 1994; Cinque 1999). In this work, only the adjunction approach is discussed and utilised. Potsdam (1998) supports the adjunction account with the following observations: adverbs are licensed by the element that they modify, can be iterated (16a) and have semantically-motivated independent order, as shown in (16b).

(16) Adverb iteration and order in English (Potsdam 1998:400)
a. John will probably wisely accept your help.
b. John will wisely probably accept your help.

The distribution of the intensifier in Fungwa is consistent with that of adverbial modifiers. As shown earlier, the intensifier only occurs on a nominal stem with the evaluative morphemes, namely diminutive and augmentative. As a result of this co-occurrence, the evaluative morphemes can be considered the licensor of the intensifier. The intensification is structurally represented with the syntactic tree in (17).

(17) a. [bù-**gù**gátà] b. [**bú**bú-gátà] '**very** big heart'



In (17), the augmentative morpheme modifies a noun phrase (NP) which is projected by a bare noun (i.e [gétɛ̀] 'heart'). To modify the augmentative morpheme in (17a), the intensifier attaches to the NP which is a composite of the augmentative morpheme and the bare noun. For number marking, the noun-class prefix attaches to the NP which is projected by the intensifier. In (17b) where the NP is a composite of the noun-class prefix, the augmentative modifier and the bare noun, the intensifier modifies the augmentative morpheme by preceding the prefix and projecting an NP. See Akinbo (2021b) for details on the syntax of the evaluative formation and bare nouns.

I now turn to the free order between the noun-class prefixes and the intensifier. Akinbo (2021b) analyses the noun-class prefixes in Fungwa as modifiers, just as the intensifier. If we accept the account of the noun-class prefixes in Akinbo (2021b), we can explain the free order between the intensifier and the noun-class prefixes. Under this account, the intensifier, in other words the reduplicant, is expected to precede both V and CV prefixes, as presented in Table 1. As we will see in §5.6, that the V prefixes are not reduplicated is phonologically conditioned.

The account in this work is that the intensifier is a reduplicative prefix which can be morphosyntactically repeated. In this case, each cycle of repetition increases the intensity of the evaluative formation. For example, in the intensification of the diminutive form [kítɛ̀] 'small cockroach', the first reduplication [**kì**kítɛ̀] 'very small cockroach' involves one instance of the intensifier; the second iteration of the reduplication [**kìkì**kítɛ̀] 'very! small cockroach' involves two instances of the intensifier and so on. The pattern of reduplication in Fungwa is comparable to the morphosyntactic repetition of the adverb *very* and nonreduplicative morphemes like *pre-* in English: *pre-season*; *pre-pre-season* (see Zirkel 2010).

In the next section, I discuss the implications of the morphophonological properties of the intensifier for linguistic theory.

4.2 Reduplication and repetition as sound symbolism

The association of reduplication with the notion of intensification is a common pattern of sound symbolism crosslinguistically (Awoyale 1989; Urbanczyk 1996; Hinton, Nichols & Ohala 2006). Sound symbolism is not limited to reduplication but includes the repetition of morphemes, words or phrases (Nuckolls 1992; Brown 1999). Repetition is ubiquitous in verbal arts (Rydland & Aukrust 2005; Moore 2011; Sun 2011; Smith 2015) and ideophones (Awoyale 1981 on Yorùbá; Childs 1988 on Kisi; Ameka 2001 on Ewe; Egbokhare 2001 on Emai; Dingemanse 2011 on Siwu).

In his work on reduplication in ideophones, Dingemanse (2015) makes a distinction between descriptive and depictive reduplication. Descriptive reduplication has highly conventionalised meaning and straightforward grammatical interpretation, but the meaning of depictive reduplication is harder to pin down and requires gradient concepts such as intensity and degree. Drawing insight from the work of Gil (2011), Dingemanse (2015) notes that the main distinction is that the descriptive reduplication is restricted to a specific copy, but the output of depictive reduplication is not restricted to a copy. Based on this, Dingemanse (2015) analyses the non-restrictive reduplication found in ideophones across languages as examples of depictive (or expressive) reduplication. The proposal in Dingemanse (2015) can be extended to the evaluative intensifier in Fungwa.

The expression of intensification with depictive reduplication or repetition is a common pattern of non-arbitrary relations between sound and meaning (Urbanczyk 1996; Hinton et al. 2006; Dingemanse 2015). Another pattern of sound symbolism involves expressing diminutive and augmentative with front and back features respectively (e.g bémbé 'small' bàmbà 'big' in Yorùbá) (Sapir 1929; French 1977; Awoyale 1989; Stump 1993; Diffloth 1994; Körtvélyessy 2014; Alderete & Kochetov 2017). According to the frequency-code hypothesis (Ohala 1984, 1994), the association of low acoustic frequency (e.g., low F2 for back vowels and low F0 of L tone) with the notion of augmentation and high acoustic frequency (e.g., high F2 of front vowels and high F0 of H tone) with the notion of diminution is biologically and phonetically grounded in the fact that the frequency of a vibrating body is inversely correlated to its mass. In this case, smaller bodies have high acoustic frequency, and larger bodies have low acoustic frequency. The morphophonological features and licensors of the intensifier in Fungwa are consistent with crosslinguistic patterns of sound symbolism in evaluative morphology. Sound symbolism of the evaluative formation involves F2, but future research on Fungwa should investigation whether other patterns of sound symbolism involves F0.

Due to the longstanding view that the relations between sound and meaning are completely arbitrary (Hockett 1960; de Saussure 1974), the non-arbitrary link between form and meaning is seldom integrated

with core grammar. Challenging the longstanding view, recent studies have shown that there is a parallel between arbitrary and non-arbitrary sound-meaning association. For example, just like arbitrary morphophonological patterns, ideophones across languages have complete or partial reduplication (Awoyale 1981, 1989; Ibarretxe-Antuñano 2017). While most bases of arbitrary reduplicative patterns are free morphemes (Hurch 2005), ideophones are well known for having both bound stems and free stems as the base of reduplication (Awoyale 1989; Dingemanse 2015). By considering the parallel between arbitrary and non-arbitrary sound-meaning association, recent studies argue for the integration of sound symbolism into general linguistic theory (Yip 1999; Stanford 2007; Alderete & Kochetov 2017; Kawahara 2020).

In the next section, I show that the phonological features of the intensifier are not only comparable to the arbitrary phonological patterns in Fungwa but can be accounted for using the classical base-reduplicant relations in Correspondence Theory (McCarthy & Prince 1993, 1995). Before turning to a phonological account of the reduplication, the summary of the discussion here is as follows: the intensifier is a modifier which is licensed by the evaluative morphemes; the intensifier can be multiply iterated and freely adjoined to a phrase, which contains the evaluative morphemes; and the intensifier with(out) its iteration is a morphosyntactically motivated pattern of sound symbolism.

5 Phonological account of the intensifier

5.1 Syllable size and iteration of the intensifier

The account in this work is that the intensifier is RED, which is a phonologically empty morpheme (McCarthy & Prince 1993, 1995). As described in Urbanczyk (1996:p. 16), "the output contains the reduplicant, which is the phonological exponent of RED, and the base, which is an adjacent string that provides segmental or suprasegmental content for the reduplicant". The constraint MAX-BR drives base-reduplicant correspondence by requiring every base segment and prosody — including tone — to be in correspondence. In this case, MAX-BR drives a complete copying of the base. To account for the syllable-size limit of the intensifier and its morphological status, I adopt the Generalised Template Theory (McCarthy & Prince 1994b; Urbanczyk 1996) that the shape of RED is determined by its morphological categorisation. Under this account, the intensifier is categorised as an affix and subject to the same phonological conditions as an affix. In this case, the intensifier could have been a prefix, an infix or a suffix. That the intensifier is a prefix is consistent with the morphological status of all the segmental nominal affixes in Fungwa. Furthermore, the intensifier is monosyllabic like all the nominal prefixes. Formally, the monosyllabic size of all affixes, including the intensifier, can be accounted for with the constraint AFFIX$\leq \sigma$.

(18) MAX-BR
Every element of the base has a correspondent in RED.
If x=an element in the base and y=an element in RED, then x$\mathscr{R}$y.

(19) AFFIX$\leq \sigma$ (Urbanczyk 1996:40)
The phonological exponent of an affix is not larger than a syllable.

The constraint AFFIX$\leq \sigma$ assigns a violation mark to an affix that is greater than σ, but it does not stipulate the presence or absence of an onset on the affix. Following from this, the intensifier could have been a V, CV or CVC syllable. Fungwa does not permit a coda under any circumstances, so the option of CVC as the shape of the reduplicant must be ruled out by the constraint NOCODA. That the intensifier is a CV syllable can be considered the effect of the constraint ONSET, which requires a consonant to be aligned with the left edge of a syllable in ω (Itô & Mester 1999).

The effect of the onset condition is not limited to the intensifier. For example, seven of the nine noun-class prefixes in Fungwa (seen in Table 1) are consonant-initial. That said, the fact that C2/C7 prefixes are onsetless suggests that the onset condition is not undominated in Fungwa. See Akinbo (2021b) and §5.6

for details. We can further argue for the effect of onset condition if we consider that most native lexical morphemes in Fungwa are consonant-initial, as seen in Table 2. Even the two vowel-initial root morphemes found in the language, [èlédè] 'pig' and [àgógó] 'gong', are likely to be loanwords as they are also found in Hausa, Yorùbá and other Nigerian languages.

Table 2: Grouping native root morphemes in Fungwa based on their syllables

roots	**cv**	**cv.cv**	**cv.cv.cv**	**cv.cv.cv.cv**	**v.cv.cv**
counts	73(9.92%)	481(65.35%)	151(20.52%)	29(3.94%)	2(0.27%)

In (20), I illustrate the base-reduplicant copying. The reduplicants are boldfaced, and the base of the reduplicant is underlined. For all the tableaux in this work, any candidates that do not realise the diminutive and augmentative morphemes are omitted.

(20) /**RED** + pḭ́ʔḭ + [−back]$_{\text{DIM}}$ / → [**pḭ̀**pḭ́ʔḭ] 'very small he-goat'

	RED + pḭ́ʔḭ + [−back]$_{\text{DIM}}$	ONSET	NOCODA	AFFIX$\leq \sigma$	MAX-BR
a.	**pḭ́.ʔḭ̀**.pí.ʔḭ			*!	
b.	**pḭ́ʔ.**pḭ́.ʔḭ		*!		**
c. ☞	**pḭ̀**.pḭ́.ʔḭ				***
d.	**ḭ̀**.pí.ʔḭ	*!			****

The candidate in (20a) is ruled out for violating AFFIX$\leq \sigma$. (20b) satisfies AFFIX$\leq \sigma$ but loses for violating NOCODA. ONSET prohibits the reduplicants from being onsetless, as shown in (20d). To appreciate the effect of ONSET, see §2.2 and §5.6. The winner satisfies other constraints but violates MAX-BR.

Similar to a single reduplicative affix (21a), the repetition of the reduplicative morpheme also involves a one-to-one correspondence relation between the base and the reduplicant. However, the correspondence relation could be between the base and each iteration of the reduplicant, as in (21b), or the base of the outermost reduplicant is itself a reduplicant-base composite, as in (21c). The numeral indexation indicates whether the reduplicative segment is in correspondence or not with that of the base segment in parentheses.

(21) a. **pù**$_1$-(pò$_1$ló)
b. **pù**$_1$-**pù**$_1$-(pò$_1$ló)
c. **pù**$_2$-(**pù**$_{12}$-(pò$_1$ló))

In line with the standard view that a reduplicant and its base are immediately string adjacent to each other (McCarthy & Prince 1995; Urbanczyk 1996), I assume the structure in (21c). If RED of an intensifier or its iteration is not in correspondence with the base, the constraint MAX-BR is violated for every segment and suprasegment of the base. In this case, the effect of MAX-BR is comparable to that of constraints, which assign violation to a morpheme without a phonetic exponent in the output (e.g., Realize-Morph in Gnanadesikan 1997; Kurisu 2001). This account of iterative reduplication is illustrated in (22). Each of the reduplicants is distinguished with a hyphen, while the base of the outermost reduplication is underlined.

(22) /**RED** + **RED** + kà + [−back]$_{\text{DIM}}$/ → [**kì̀kì̀**kɛ̀] 'a very small you'

	RED + **RED** + kà + [−back]$_{\text{AUG}}$	MAX-BR
a.	**RED RED** kɛ̀	****!**
b.	**RED** **kì̀**-.kɛ̀	****!**
c. ☞	**kì̀**-.**kì̀**-.kɛ̀	***

The candidates in (22a-b) are ruled out because one or both reduplicants do not correspond with the base (sub)segments. The candidate in (22c) wins because the intensifier and its iterations satisfy MAX-BR.

Before accounting for the vowel of the reduplicant, the summary of the discussion in this section is that the CV shape of the intensifier is morphophonologically motivated; like most of the segmental affixes in Fungwa, it is prefixal, monosyllabic and onsetful.

5.2 Vowels of the intensifier

Recall that the vowel of the intensifier is consistently high regardless of the height of the following base vowel. To account for the high vowel of the intensifiers, there are options of (i) vowel prefixation, (ii) back copying (iii) epenthesis or (iv) unfaithful base-reduplicant copy. For a vowel-prefixation account, the intensifier will be some sort of affixal high vowel, which is [ì]- or [ù], or has zero specification for [BACK] feature /Ì/. This option of vowel prefixation might make the intensifier comparable to the onsetless prefixes which do not bear an onset in any situation (see Akinbo 2019).[2] Under this account, the intensifier would be similar to the C11 prefix, which is a prefix with the phonological properties [í]. In this sense, the intensifier might not be RED (similar to the treatment of the gerundive prefix in Yorùbá by Pulleyblank (2009)) and might be misaligned with the domain of reduplication, like V prefixes in vowel harmony (see §2.2). The property of the intensifier is not consistent with vowel prefixation considering that the onset of the intensifier is a copy of the following consonant. The vowel-prefixation account will also wrongly predict a reduplicant with an invariant L tone in the reduplication of CV prefixes (see §5.4).

I now turn to the option of back copying. Under a back copying account, the reduplicant copies the initial vowel of the base except when the base vowel is non-high. This being the case, the base vowel is realised as a high vowel and then copied by the reduplicant. Back copying is attested across languages (McCarthy & Prince 1995; Caballero 2006), but this solution is not adopted in Fungwa given that the root vowels are invariant in terms of the feature [high]. The invariance of root vowels in terms of the feature [high] can be considered the effect of the constraint IDENT-IO[HIGH], which requires the [high] feature value of an input to be identical to that of its output correspondent.

Both epenthetic and unfaithful-copy accounts are plausible. For analytical purposes, I will assume however that the vowel of the intensifier being consistently high involves an unfaithful copy of the base vowel. In this case, the vowel of the reduplicant is not in correspondence with the base in terms of the feature [high] when the base vowel is [−high]. The high vowel of the intensifier can also be morphophonologically motivated considering that all the CV prefixes have high vowels (see §2.1). The preference for high vowels in a reduplicative affix is not peculiar to Fungwa but is attested across languages (e.g., Banfield & Macintyre 1915 and Kawu 2002 on Nupe, Urbanczyk 1996 on Lushootseed, Ejeba 2016 on Igala, etc.). The preference for high vowel can be considered an effect of the constraint *[−HIGH], which prohibits non-high vowels (Howe & Pulleyblank 2004). When the following base vowel is [+HIGH], the reduplicant can satisfy the constraint *[−HIGH]. Unfaithful base-reduplicant copy only occurs when the following base vowel is [−HIGH]. Under this account, the constraint *[−HIGH] has to be ranked below IDENT-IO[HIGH]. With

[2] Alderete, Beckman, Benua, Gnanadesikan, McCarthy & Urbanczyk (1999) argues that the pattern of a high vowel in reduplicants is not a reflection of fixed segmentism, but rather an emergence of the unmarked effect.

this ranking, we can account for the high vowel of the intensifier. The numeral indexation indicates whether the feature of the reduplicative segment is in correspondence or not with that of the base segment.

(23) /**RED** + pèlé + [+back]$_{\text{AUG}}$ / → [**pù**pòló] 'a very big cap'

	RED + pèlé + [+back]$_{\text{AUG}}$	ID-IO[HIGH]	*[−HIGH]	MAX-BR
a.	**p**$_1$**ò**$_2$.p$_1$ò$_2$.l$_3$ó$_4$		***!	***
b. ☞	**p**$_1$**ù**$_2$.p$_1$ò$_2$.l$_3$ó$_4$		**	***
c.	**p**$_1$**ù**$_5$.p$_1$ò$_2$.l$_3$ó$_4$		**	****!
d.	**p**$_1$**ù**$_2$.p$_1$ù$_2$.l$_3$ó$_4$	*!	*	***

The candidate in (23a) loses for incurring a fatal violation of *[−HIGH]. For violating IDENT-IO[HIGH], (23d) is ruled out. The candidate in (23c) is ruled out for incurring a fatal violation of MAX-BR. By unfaithfully copying the vowel of the base, the candidate in (23b) wins. In sum, the high vowel of the reduplicant is an unfaithful-base copy when the base vowel is non-high.

5.3 Tonal properties of noun-class prefixes

To account for the tone of the reduplicant, we must understand the tonal specification of the prefixes in Fungwa. As shown in §2.2, certain prefixes in Fungwa obligatorily bear the same tone as the following root-initial TBU. The tones of the other prefixes are invariant regardless of the tone of the following TBU.

The account in Akinbo (2021b) is that the prefixes with tonal alternation are underlyingly toneless, but the fixed-tone prefixes are underlyingly specified for tone. That the toneless prefixes bear a tone in the output is considered an effect of the constraint SPEC(T), which requires every TBU to bear a tone (Pulleyblank 1986, 1997; Zoll 2003). Crosslinguistically, toneless affixes are assigned tone via tone epenthesis or multiply linking with the tone of an adjacent TBU (Bickmore 1995; Pulleyblank 1997; Anttila & Bodomo 2000). The option of epenthesis can incur a violation of the constraint DEP-IO(T), which requires every output tone to have an input correspondent (Pulleyblank 1997; Zoll 2003). When the epenthetic tone is adjacent to a similar tone, the option of epenthesis can also lead to the violation of the obligatory contour principle (OCP), which is a condition that prohibits consecutive identical features (Odden 1986). The OT instantiation of the condition that is relevant to Fungwa is the constraint OCP-(H), which assigns violation to a sequence of H tones (Cahill 2004; Hyman 2009). The option of multiply linking the tone of the stem with the toneless prefix can blur the boundary of morphological or prosodic categories. Such a boundary-crossing solution for assigning tone to a toneless affix can result in the violation of constraint CRISP-EDGE[Root, T], prohibiting any linking of tones across root boundaries (Itô & Mester 1999; Selkirk 2011).

(24) Markedness contraints

a. SPEC(T): Every TBU dominates a tone.
b. OCP-(H): No sequence of H tones on adjacent TBUs.
c. CRISP-EDGE[Root, T]: A tone must not cross root boundaries.

(25) Faithfulness constraints

a. DEP-IO(T): Every tone in the output has a correspondent in the input.
b. MAX-IO(T): Every input tone has an output correspondent.

Considering the toneless prefixes bear the same tone as the following TBU of the stem, the account in Akinbo (2021b) is that the tones of the root-initial TBU are multiply linked to the toneless prefixes. This solution does not only satisfy SPEC(T) but the constraints DEP-IO(T) and OCP-(H). To account for the tones in Fungwa, SPEC(T) and DEP-IO(T) do not need to be crucially ranked. The ranking of these constraints

is shown in (26) and (27). In the tableaux, an autosegmental association line is indicated with parentheses. The alphabetic indexation represents the correspondence relation of the tone. As shown in (26), the ranking predicts the right output candidate for the toneless prefixes.

(26) /**bI** + gɛ́tɛ̀ / → [**bi**́gɛ́tɛ̀] 'heart'

	bI + (gɛ́)$_a$(tɛ̀)$_b$	SPEC(T)	DEP-IO(T)	OCP-(H)	CRISP-E[R, T]
a.	**bi**.(gɛ́)$_a$.(tɛ̀)$_b$	*!			
b.	(**bi**̀)$_c$.(gɛ́)$_a$.(tɛ̀)$_b$		*!		
c.	(**bi**́)$_c$.(gɛ́)$_a$.(tɛ̀)$_b$		*!		*
d. ☞	(**bi**́.gɛ́)$_a$.(tɛ̀)$_b$				*

Setting aside briefly the tone of the toneless prefixes, I now turn to the invariant prefixes. The prefixes with an invariant L tone can satisfy the constraints OCP-(H) and CRISP-EDGE[Root, T] without any tonal change to the root or the prefix, but the prefixes with an invariant H tone can violate the constraint OCP-(H) when the tone of the following TBU is H. One way of satisfying such constraint is multiply linking the root tone with the prefix, but this can result in deleting or floating one of the adjacent H tones. For simplicity, I only discuss the option of deletion. The option of deletion would lead to the violation of the constraint MAX-IO(T), which requires a tone in the input to have a correspondent in the output (Pulleyblank 1997; Zoll 2003). Considering the surface ambiguity between a multiply linked tone and two sequences of the same tone, we cannot say whether OCP-(H) is satisfied when a H-tone prefix precedes a stem-initial TBU with a H tone. Given that prespecified tones of root morphemes and prefixes in Fungwa are never overridden, I assume that the optimal solution for the prefixes with an invariant H tone involves the violation of the constraint OCP-(H). This is illustrated in (27).

(27) /ɪ́- + jɪ́jɛ̀ / → [ɪ́jɪ́-jɛ̀] 'goat'

	(ɪ́-)$_a$ + (jɪ́)$_b$(jɛ̀)$_c$	SPEC(T)	DEP-IO(T)	MAX-IO(T)	OCP-(H)	CRISP-E[R, T]
a. ☞	(**ɪ́**)$_a$.(jɪ́)$_b$.(jɛ̀)$_c$				*	
b.	(**ɪ́**.jɪ́)$_b$.(jɛ̀)$_c$			*!		*
c.	(**ɪ̀**)$_d$.(jɪ́)$_b$.(jɛ̀)$_c$		*!			
d.	(**ɪ́**)$_a$.(jɪ̀.jɛ̀)$_c$			*!		

Now that I have accounted for the toneless prefixes and those that are specified for tone, I will show that the account of tone mapping for the prefixes can be extended to the intensifier.

5.4 Tonal property of the intensifier

The discussion in this section focuses on the tone of the intensifier by drawing insight from the analysis of the prefix tone. Before turning to the tone of the reduplicant with a prefix-root composite as its base, I focus on the tone of the reduplicant with only a root as its base. As shown earlier, the reduplicant consistently bears a L tone regardless of the tone of the following base TBU. Across languages, tonal asymmetries

between base and reduplicant are either analysed as (i) prespecified tone of the reduplicative morpheme (Qu 1995; Kawu 2002; Pulleyblank 2009) or (ii) an epenthetic tone (Glewwe 2017). Under the prespecification account, the intensifier is expected to have a L tone, regardless of whether the base of reduplication is a root or prefix-root composite. The prespecification account will predict that the intensifier should behave like the prefixes with invariant tone. The prediction does not hold considering that the reduplicant can bear a H tone when the base of reduplication is a root-prefix composite.

I now turn to the epenthetic account. Recall that the constraint MAX-BR is specific to segments and features. The reduplicant has to copy the tone alongside segments of the following base syllable when the base is a root. Copying the tone of the base will satisfy the constraint CRISP-EDGE[Root, T] but can result in the violation of OCP-(H) when the base-initial TBU has a H tone. In this case, the possible ways to satisfy the constraint OCP-(H) are (i) spreading the tone of the base to the reduplicant, (ii) back copying a L tone unto the base TBU or (iii) epenthesising a L tone in the reduplicant. The option of spreading is not plausible considering that the reduplicant consistently bears a L tone when the base is a root. Similarly, the option of back copying of L tone unto the base TBU is not plausible, considering that the tones of root morphemes are consistently invariant. The invariance of the root-internal tone can be considered an effect of the constraint MAX-IO(T) (Pulleyblank 1997; Zoll 2003). To satisfy the constraint OCP-(H) with the epenthetic solution, a L tone has to be inserted in the reduplicant. The option of epenthesis will result in the violation of the constraint DEP-BR, which requires every element of the reduplicant to have a correspondent in the base (McCarthy & Prince 1995; Glewwe 2017).

This account of the reduplicant tone is illustrated in tableaux (28) and (29). For the account, the constraint OCP-(H) must be ranked above DEP-BR. Only the relevant constraints are included the tableaux.

(28) /**RED** + gɛ́tɛ̀ + [+back]$_{AUG}$ / → [**gù**gátà] 'very big heart'

	RED + (gɛ́)$_a$(tɛ̀)$_b$ + [+back]$_{AUG}$	MAX-IO(T)	OCP-(H)	CRISP-E[R, T]	DEP-BR	MAX-BR
a.	(**gú**.gá)$_a$.(tà)$_b$			*!		***
b.	(**gú**)$_a$.(gá)$_a$.(tà)$_b$		*!			***
c.	(**gù**)$_a$.(gà)$_a$.(tà)$_b$	*!				***
d. ☞	(**gù**)$_c$.(gá)$_a$.(tà)$_b$				*	****

(29) /**RED** + **RED** + gɛ́tɛ̀ + [+back]$_{AUG}$ / → [**gùgù**gátà] 'very! big heart'

	RED + **RED** + (gɛ́)$_a$(tɛ̀)$_b$ + [+back]$_{AUG}$	MAX-IO(T)	OCP-(H)	CRISP-E[R, T]	DEP-BR
a.	(**gú**.**gú**.gá)$_a$.(tà)$_b$			*!	
b.	(**gú**.**gú**)$_a$.(gá)$_a$.(tà)$_b$		*!		
c.	(**gù**.**gù**)$_a$.(gà)$_a$.(tà)$_b$	*!			
d. ☞	(**gù**.**gù**)$_c$.(gá)$_a$.(tà)$_b$				*
e.	(**gù**)$_c$.(**gù**)$_d$.(gá)$_a$.(tà)$_b$				**!

The constraint ranking in (28) prohibits the reduplicant from bearing a H tone. The candidate in (28a) incurs a fatal violation of CRISP-EDGE[Root, T] for spreading the tone of the root to the reduplicant. By

copying the tone of the root-initial TBU, the candidate in (28b) satisfies CRISP-EDGE[ROOT, T], but it is ruled out for violating OCP-(H). The candidate in (28c) satisfies the constraints OCP-(H) and CRISP-EDGE[Root, T], but it incurs a fatal violation of IDENT-IO(T). The winning candidate in (28d) satisfies OCP-(H) and CRISP-EDGE[Root, T] by epenthesising a L tone in the reduplicant. This account can be extended to cases with multiple iterations of the intensifier. It bears mentioning that the constraint CRISP-EDGE[Root, T] is not at play for iterations of the reduplicant. For the sake of economy, MAX-BR is excluded from tableau (29), which illustrates the iteration of the reduplicant.

I now turn to the tone of the reduplicant when the base is a prefix-root composite. In this regard, recall that the reduplicant bears the same tone as the following CV prefix of the base. As illustrated in tableau (30), the account of the reduplicant tone in other cases can likewise be extended to the CV-prefix reduplication.

(30) /**RED** + bI + gɛ́tɛ̀ + [+back]$_{\text{AUG}}$/ → [**bú**bú-gátà]

	RED + bI- $(\text{gɛ́})_{\text{a}}(\text{tɛ̀})_{\text{b}}$ + [+back]$_{\text{AUG}}$	DEP-IO(T)	OCP-(H)	CRISP-E[R, T]	DEP-BR
a.	$(\textbf{bú})_{\text{a}}.\underline{(\textbf{bú}.\text{gá})_{\text{a}}.(\text{tà})_{\text{b}}}$		*!	*	
b. ☞	$(\textbf{bú}.\underline{\textbf{bú}}.\text{gá})_{\text{a}}.(\text{tà})_{\text{b}}$			*	
c.	$(\textbf{bù})_{\text{c}}.\underline{(\textbf{bú}.\text{gá})_{\text{a}}.(\text{tà})_{\text{b}}}$			*	*!
d.	$(\text{bù}.\underline{\textbf{bù}})_{\text{c}}.(\text{gá})_{\text{a}}.(\text{tà})_{\text{b}}$	*!			

The base of reduplication in (30) is the composite of a toneless CV prefix and a H-tone-initial root. As expected, the H tone of the root is multiply linked with the CV prefix. For copying the H tone of the CV prefix, the candidate in (30a) incurs a fatal violation of OCP-(H). The candidate in (30c) satisfies OCP-(H) by epenthesising a L tone in the reduplicant, but it is ruled out for violating DEP-BR. Multiply linking the tone of the root base with that the CV prefix and the reduplicant does not incur a new violation of CRISP-EDGE[R, T]. By multiply linking the tone of the base with the reduplicant, the winning candidate in (30b) satisfies OCP-(H) to the detriment of CRISP-EDGE[Root, T]. The difference between the prefixes and reduplicants in their violation of CRISP-EDGE[R, T] is from the ranking of DEP-IO(T) and DEP-BR. As shown in (30d), satisfying DEP-IO(T) to the detriment of CRISP-EDGE[R, T] is not a preferable solution.

In sum, the reduplicant is specified for tone by copying the tone of the base except when the base is a root morpheme with a H tone. In this case, the reduplicant is specified for tone with an epenthetic L tone. When the base of reduplication is a prefix-root composite, the tone of the CV prefix is multiply linked with the reduplicant. The options of epenthetic L tone and multiply linking tone are results of the constraints OCP-(H) and CRISP-EDGE[Root, T].

5.5 When the target is a CV prefix

This section presents an account of the CV-prefix reduplication by referring to the syntactic account in §4. In the structure, the intensifier either attaches to a root or to a prefix-root composite. The proposal in this section is that being able to reduplicate either the CV prefix or the root is the result of this syntactic structure.

For the input-output mapping that involves the reduplicant attaching to a prefix-root composite as its stem, the string of elements in the prefix-root composite would be adjacent to the reduplicant. For the input-output mapping that involves the reduplicant attaching to a root as its stem, the elements of the root would be adjacent to the reduplicant. The string adjacency between the reduplicant and the morphological stem is possible in the input-output mapping if the linear order of elements in the input is maintained in the output.

(31) LINEARITY (McCarthy & Prince 1995:123)
S_1 is consistent with the precedence structure of S_2, and vice versa.
Let x, y $\in S_1$ and x', y'$\in S_2$. If x*R*x' and y*R*y', then x $<$ y iff$\neg$ (y'$<$x').

The constraint LINEARITY is mostly applied to segments (e.g., McCarthy & Prince 1995; Hume 2001), but the definition of the constraints is applicable to morphological order (e.g., Horwood 2002; Lubowicz 2010). The constraint LINEARITY can preserve the precedence relation of input morphemes in their output correspondents. This account is shown in (32) and (33).

(32) / bI + **RED** + tʃàké + [+back]$_{AUG}$/ → [bù-**tʃù**tʃàkó] '**very** big marijuana'

	bI + **RED** + tʃàké + [+back]$_{AUG}$	LINEARITY
a.	**bù**.bù.tʃà.kó	*!
b. ☞	bù.**tʃù**.tʃàkó	

Because the root is the stem of the reduplicant in the input, the elements of the root morpheme are copied as the base of reduplication, as shown in (32b). The constraint rules out a candidate which does not preserve the linear order of morphemes in input-output mapping, as shown in (32a).

(33) /**RED** + bI + tʃàké + [+back]$_{AUG}$/ → [**bù**bù-tʃàkó] '**very** big marijuana'

	RED + bI + tʃàké + [+back]$_{AUG}$	LINEARITY
a. ☞	**bù**.bù.tʃà.kó	
b.	bù.**tʃù**.tʃàkó	*!

Similarly, in (33), the constraint rules out a candidate which alters the order of input morphemes. By preserving the morpheme order between the reduplicant and the prefix-root stem in the input-output mapping, the reduplicant copies the elements of the prefix-root composite. Prosodically, the prefix-root composite or the root being the base of reduplication results in the reduplicant having an adjacent string with a CV syllable. Therefore, in the base-reduplicant relation, there is no need to change the prefix-reduplicant order in the input-output mapping in order to satisfy the onset requirement. To conclude, I have argued that the reduplication of the CV prefixes is the result of the morphosyntactic position of the reduplicant.

5.6 Vowel hiatus and reduplication

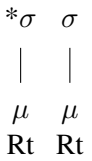
On the surface, it seems that, for words with a CV prefix (see §3.3), the affix order *Very+Class+Root* is possible alongside the order *Class+Very+Root*, but for words with a V prefix (15), only the latter seems to be allowed. If we consider the syntactic account of the intensifier as a modifier in §4, the affix orders *Very+Class+Root* and *Class+Very+Root* should be possible for both CV- and V- prefixes. To account for the V- prefixes not undergoing reduplication, let us assume the form in (34) has the *Very+Class+Root* order as the syntactic input.

(34) /**RED** + í + pí?ḭ̀ + [+back]$_{DIM}$/ → [í-**pì**pí?ḭ̀] 'very small he-goat'
a. *[**ì**-í-pí?ḭ̀]
b. *[**pì**-í-pí?ḭ̀]
c. [í-**pì**pí?ḭ̀]

For such an input, there is a possibility of the reduplicant copying the vowel of the V prefix, as shown in (34a). For the reduplicant to satisfy the onset condition, it could copy the base-initial consonant in addition

to the vowel of the V prefix, as in (34b). However, these options will result in the violation of the onset condition (see §2.2) and the constraint NO-HIATUS (Orie & Pulleyblank 2002), which prohibits a sequence of vowels across a syllable or mora boundary.

(35) NO-HIATUS
No sequence of vowels across a syllable or moraic boundary



(36) Height-based sonority scale and hiatus
MAX-IO[−HIGH]>>NO-HIATUS>>MAX-IO[+HIGH]

The prohibition of vowel hiatus in Fungwa is not limited to the reduplicant but includes vowel-initial prefixes in stem-prefix contexts. Recall in this regard that only the vowels [i, a] occur as vowel-initial prefixes in the language (see §2.1). When root-final vowels and V prefixes occur in a vowel hiatus, the V prefix with [i] is elided but the prefixes with [a] survive deletion as a result of height-based sonority scale (see Akinbo 2021b:for more details). Following Howe & Pulleyblank (2004), the height-based sonority scales are encoded as faithfulness constraints, as shown in (36).

(37) V- prefixes in a vowel

	Root		**V**-Root			
a.	sé	+	**í**-jíjè	→	séjíjè	'so a/the goat'
	ká́	+	**í**-jíjè	→	ká́jíjè	'killed a/the goat'
b.	sé	+	**à**-ʔátà	→	séàʔátà	'so the people'
	ká́	+	**à**-wà	→	ká́àwà	'killed a/the dog'

For the reduplicant to satisfy NO-HIATUS, there are two options: (i) the reduplicant metathesises with the vowel-initial prefix and (ii) delete the vowel-initial prefix. The option of deletion can apply to the vowel-initial prefix with high vowels but will wrongly predict that the vowel-initial prefixes with non-high vowels are reduplicated. I now turn to the metathesis account. Unlike the vowel-initial prefixes, the intensifier can satisfy NO-HIATUS if the reduplicant metathesises with the vowel-initial prefix. Consequently, the reduplicant copies the consonant and vowel of the nominal root. The option of reduplicant-prefix metathesis can satisfy the faithfulness constraints in (36) but can result in the violation of the constraint LINEARITY.[3]

The constraint ONSET might also be at play, considering that it requires a syllable in ω to begin with a consonant. Just like the V prefixes in backness harmony (see §2.2), the V prefixes of the attested reduplicated form, such as [í-**pì**píʔì̀], will have to misalign with ω. Tableau (38) illustrates this account. Note that the edges of ω are indicated with square brackets. Only the relevant constraints are included in the tableau.

[3] As Laura McPherson notes in her comment, the vowel-initial prefixes not undergoing reduplication could also be accounted for by reference to phonologically motivated ineffability (e.g., Fanselow & Féry 2002; Nevins & Vaux 2003).

(38) /**RED** + ḯ + pḯʔì̗ + [+back]$_{\text{DIM}}$/ → [ḯ-**pì**pḯʔì̗] ‘a very big he-goat’

	RED + ḯ + pḯʔì̗ + [+back]$_{\text{AUG}}$	ONSET	NO-HIATUS	LINEARITY
a.	[**ì**.ḯ.pḯʔì̗]	*!*	*	
b.	[**pì.**ḯ.pḯʔì̗]	*!	*	
c.	[ḯ.**pì**.pḯʔì̗]	*!		*
d. ☞	ḯ.[**pì**.pḯʔì̗]			*

The losing candidates in (38a-c) violate ONSET and NO-HIATUS. The candidate in (38c) satisfies NO-HIATUS but is ruled for violating ONSET. The winning candidate satisfies NO-HIATUS and ONSET to the detriment of LINEARITY, as shown in (38d). The form [ḯ-pḯʔì̗] is phonologically comparable to the loanword [àgógó], except the initial vowel of the loanword is a segment of the root. The present account predicts that the initial vowel of the loanword should be misaligned with the prosodic word. In sum, I have argued that the onsetless prefixes not being targeted for reduplication is a result of vowel hiatus and the onset requirement on ω.

6 Summary and conclusion

I have described and analysed the pattern of partial reduplication in Fungwa: (i) the intensity of evaluatives is marked via reduplication, (ii) the reduplicant is a CV syllable, where C is a copy of the base-initial consonant and V is either [i] or [u] with a L tone, depending on the backness of the base-initial vowel; (iii) when the base is a toneless CV prefix, the prefix and the reduplicant bear the same tone as the root-initial TBU; (iv) the V prefixes, unlike the CV prefixes, are not targeted for reduplication.

The prosodic, tonal and segmental properties of the reduplicant are product of morphological and phonological constraints. The intensifier being monosyllabic is considered to be the effect of the lexical specification σ. Since the lexical specification cannot force the presence or absence of an onset for the reduplicant, the intensifier being a CV syllable like most of the class prefixes in Fungwa is analysed to be the effect of an onset condition. The fact that the onsetless prefixes, unlike the onsetful prefixes, are not targeted for reduplication is a result of pressure from vowel hiatus and the onset condition. The multiple iteration of the reduplicant is analysed as a by-product of an input with two (or more) repetitions of the intensifier. The tone of the reduplicant is derived through the interactions between tonal alignment, the Obligatory Contour Principle and base-reduplicant faithfulness. The complete ranking of the constraints is expressed by the Hasse diagram in Figure 1.

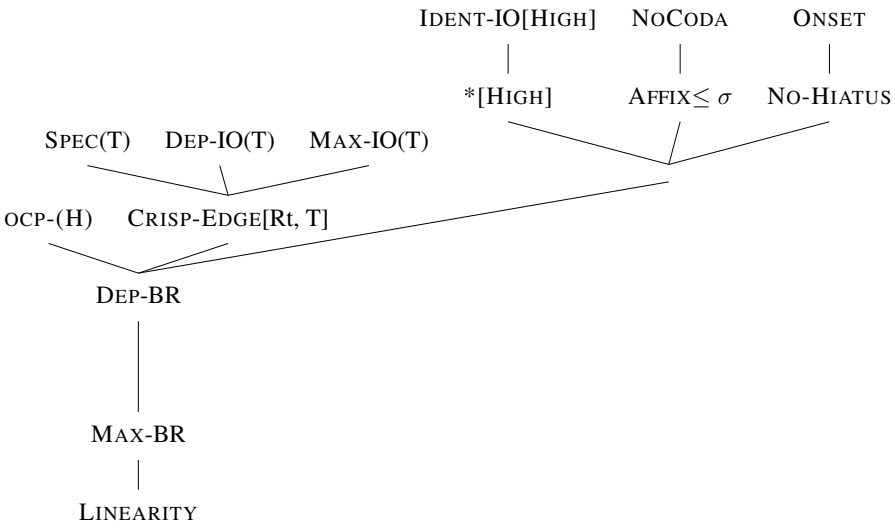


Figure 1: Complete ranking of constraints for Reduplication in Fungwa

The phonological property of the intensifier, the repetition of the intensifier and its licensing by the diminutive/augmentative formation are consistent with patterns of sound symbolism across languages. The formal account suggests a parallel between descriptive and depictive reduplication, challenging the long-standing view that sound-meaning mapping is completely arbitrary. The expression of diminutive and augmentative via reduplication has been documented in Kainji languages (e.g., MacDonell & Smith 2021 on Pangu, McGill 2009 on Cicipu, Paterson 2012 on ut-Ma'in, Aliero 2013 on C'lela etc.), but multiple iteration of a reduplicant has not been reported in other Kainji languages (cf. Dettweiler & Dettweiler 2002; McGill 2007; Smith 2007; McGill 2009; Aliero 2013; McGill 2014; Dettweiler 2015). Given that Kainji languages are underdocumented, future research on these languages should document augmentative-diminutive distinctions in these languages to determine whether this iteration is a family-wide phenomenon or an innovative feature of Fungwa.

Abbreviations

AUG	augmentative
DIM	diminutive
INT	intensifier
N	noun
NP	noun phrase
PL	plural
RED	reduplicant
SG	singular
TBU	tone-bearing unit

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Samuel Kayode Akinbo
Institute of Linguistics
University of Minnesota Twin Cities
75 East River Parkway
Minneapolis, MN 55455
sakinbo@umn.edu