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RESEARCH ARTICLE

Iconicity of grammatical tonal polarity and reduplication in Nigerian Pidgin[1]

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Abstract

This work focuses on a pattern of tonal alternation that is intertwined with a pattern of reduplication in Nigerian Pidgin. In the language, verbs are reduplicated to iconically express iteration. To convey that the iterated event occurs in an irregular or dispersive manner, the verb bears a low tone (L) on all its tone-bearing units (TBU), while the reduplicant bears a high tone (H) on all its TBUs. The resulting L-H tonal melody is considered the exponent of an irregular marker, while the intertwined reduplication is considered the exponent of an iteration marker. Due to the similarity between the exponent of the irregular marker and the iconic tonal melody of ideophones that express the semantic notions of irregularity across languages, the form-meaning mapping of the irregular marker is regarded as a grammaticalised form of the tone melody in the substrate ideophones. This suggests that ideophones can contribute to the emergence and expansion of grammar, as well as the typology of grammatical tone. Considering that perceptual resemblance between linguistic structures and the structural components of real-world elements is the basis of iconicity, the pattern of tonal alternation in Nigerian Pidgin suggests that the notion of perceptual motivation in linguistic theory is not purely phonetic and phonological but also includes the crossmodal perception of sensory imagery.

1. Introduction

This work mainly focuses on a pattern of tonal overwrite in Nigerian Pidgin (also known as Naijá), which is intertwined with a pattern of reduplication and is consistent with the grammaticalisation of iconicity. One widely attested pattern of iconicity that is relevant to this work is the expression of iteration with reduplication or repetition. The association of segmental or

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suprasegmental disharmony with the semantic notion of irregularity or disorder (e.g. *zigzag*, *pish-posh* in English) is the other pattern of iconicity that is relevant to this work (Wallace 2019). The former pattern of iconicity is ubiquitous in ideophonic and non-ideophonic forms cross-linguistically (Hurch 2005), but evidence for the latter mostly comes from lexical tendency in ideophones. To present evidence for the iconic association of phonological disharmony with the notion of irregularity in morphophonological grammar, I describe and analyse two related patterns of reduplication in Naijá, a tonal English-lexifier contact language. To express the semantic notion of iteration or intensity, Naijá completely repeats a verb, as shown in (1b). To intensify the iteration, the verb can be repeated indefinitely, with each repetition increasing the intensity of the events. The multiple repetitions are indicated with a Kleene star '*'. To express that the iterated events occur irregularly or dispersively, the verb bears an L tone on all its tone-bearing units (TBUs), while its reduplicant bears an H tone on all its TBUs, irrespective of the verb's inherent tone, as shown in (1c). The reduplicated form in (1c) can function either as a verb or noun. To intensify the expression of irregular iteration, the verb and its reduplicant have to be jointly repeated. However, in this case, the intensified form only functions as a verb. The patterns of reduplication are consistent across all documented varieties of Naijá and have remained unchanged since their initial formal analysis by Faraclas (1984), whose work was based on the Rivers variety[1].

(1) Reduplication in Naijá (source: Faraclas 1984:73, Faraclas 2002)

	'yell'	'walk'	
a.	hálà	wàká	'*Xed*'
b.	hálà **hálà**	wàká **wàká**	'*Xed* repeatedly'
	hálà **hálà hálà**	wàká **wàká wàká**	'*Xed* repeatedly*'
c.	hàlà **hálá**	wàkà **wáká**	'constantly *Xing* about'
	hàlà **hálá** hàlà **hálá**	wàkà **wáká** wàkà **wáká**	'constantly *Xing* about repeatedly*'

As a background to the discussion in this work, I present the relevant sound inventory of Naijá in §2. The two patterns of reduplication are described in §3. In §4, I present a novel account of the tonal alternation and reduplication within the framework of Optimality Theory (Prince & Smolensky 2004) but appeal to domain-general cognitive processes rather than language-specific cognitive capacity preprogrammed with linguistic representation and rules (Bybee 2003, Archangeli & Pulleyblank 2022). Following the proposal in Inkelas (2008), I analyse the pattern of reduplication associated with the expressions of iteration and intensification as morphological doubling. In his account of the reduplicative pattern that expresses irregular iteration, Faraclas (1984) attributes the tonal alternation to purely phonological rules and the reduplication to morphological doubling. Contrary to the analysis of Faraclas (1984), my account in this work is that the expression of irregular iteration involves two morphophonological components: an irregular marker with only a fixed L-H tone melody as its exponent, and an iteration-marking morpheme, which is a phonologically empty morpheme RED. Considering that the expression of irregular iteration is similar to the ideophones that express irregularity in the substrate languages in terms of their iconic tonal melody, semantic variability and non-displaceability, I argue that the irregular marker emerges from the tone melody of the ideophones expressing irregularity. As the association of phonological disharmony, such as

[1] The River variety of Naijá is spoken in Rivers State, Cross River, Imo and Anambra States.

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tone polarity, with the concept of irregularity is a pattern of iconicity (Dingemanse 2011, Ibarretxe-Antuñano 2017), the irregular marker in Naijá is consistent with a grammaticalised iconicity. The realisation of the tone melody and base-reduplicant relations are considered to be the effect of tone alignment, lexical categorisation and correspondence relations.

The results of this work are crucial to the theory of grammaticalisation and the origin of affixes, which typically is non-ideophonic words (Norde et al. 2002). The emergence of the irregular marker in Naijá shows that ideophones can contribute to lexical expansion and grammaticalisation. Another significant contribution of the present study is related to the recurrent theme that ideophones are antipathic to inflectional and derivational affixes (Dingemanse to appear). As most reported cases of derivational affixes targeting ideophones are from Bantu languages (Samarin 1971, Shangase 2001), the irregular marker in Naijá contributes to the typology of ideophones that are integrated into derivational morphology. The motivation for disharmony, such as the polar-tone melody of the irregular marker, is typically attributed to perceptual enhancement or the distinctive identification of adjacent linguistic elements (Boersma 1998). To account for patterns of phonological disharmony with iconic motivation, such as the exponent of the irregular marker, I argue for the extension of perceptual motivation in linguistic theory to include crossmodal depiction of sensory imagery. As the iconic tonal melody is deeply integrated into the morphophonology of the language, this work contributes to the argument that iconicity can motivate phonological alternations and conditions (following Alderete & Kochetov 2017, Kawahara 2020, Akinbo 2021a, 2023, Akinbo & Bulkaam 2024, Akinbo & Ekiugbo 2024). Other theoretical implications of the irregular iteration are discussed in §5. The summary and conclusion of this work are presented in §6.

2. Language Background

Naijá is an English-lexifier contact language with more than 110 million speakers along the West African coast and predominantly in Nigeria (Esizimetor 2010, Faraclas 2021). The language is mostly spoken as a first language (L1) in parts of Southern Nigeria and Lagos, and as a second language (L2) in other parts of the country. Considering that it has more features in common with creoles than pidgin, it is considered pidgincreole (Bakker 2008). There are many varieties of Naijá. To the best of my knowledge, the pattern of reduplication discussed in this work is present in all the documented varieties and has remained unchanged since its initial formal analysis by Faraclas (1984). However, in the variety spoken in the Western part of Nigeria, the pattern has extended beyond verbs to include ideophones. The present work mainly focuses on the Rivers, Western and Wafi varieties of the language. The data for the Rivers variety are from Faraclas (1984, 2002), the online corpus of NaijaSynCor and two native speakers.[2] The Wafi data is from one native speaker of the variety. As a native speaker, the data for the Western variety is from my introspective knowledge. All the data presented in this work are in phonetic transcription.

2.1. Tone

Naijá is tonal like all documented Nigerian languages, except Fulfulde. The language contrasts two tones – namely, H(igh) and L(ow) – and the tonal contrast is illustrated with

[2] https://naijasyncor.huma-num.fr/index.html

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Table 1. Tonal cooccurrence and minimal pairs in Naijá

		H	L
H	fɔ́	kóló	mágà
	'four'	'piggy bank'	'victim of scam'
L	fɔ̀	kòló	bɔ̀lɔ̀
	'preposition'	'to be crazy'	'foolish person'

the minimal pair in Table 1. As shown in the table, H tone is marked with an acute diacritic and L tone with a grave diacritic. The language also has tone contours which are restricted to bimoraic or utterance-final syllables. For example, the word [fɔ́] 'four' surfaces with an HL glide [fɔ̂] in an utterance-final position.

(2) Final lowering

	Non-final	Final
a. H	**bóró** mɔ̀ní	bórò
	'borrow money!'	'borrow!'
b. H	wìlì **plé** dì pàrárá	plê
	'Willi played a trumpet'	'play!'
c. LH	**wàká** fò híè	wàká
	'walk here!'	'walk!'

There is a prepausal tone-lowering in Naijá, especially words that are phonologically close to their English sources. As shown in (2a), the verb [bóró] 'borrow' is realised as [bórò] before a pause. When a monosyllabic verb with an H tone occurs before a pause, it surfaces with an HL contour, as shown in (2b). That said, it is important to note that the prepausal lowering mostly applies to words from English sources. Also, as illustrated in (2c), the final lowering never occurs when the verb has an L-H tone melody. This pattern of final-tone lowering is found in other creole languages around the world and is considered a 'declarative boundary tone (an utterance-final L-tone)' (Yakpo 2021). However, I consider it a pre-pausal lowering because it occurs in non-declarative constructions, as shown in (2).

2.2. Vowels and syllables

There are seven oral vowels in Naijá, as presented in (3). The vowels in Naijá are present in most if not all the Niger-Congo languages spoken in Southern parts of Nigeria (Williamson 1984, Elugbe & Omamor 1991).

(3) Vowels in Naijá

	Front	Central	Back
High	i		u
High-mid	e		o
High-low	ɛ		ɔ
Low		a	

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The language also has nasalised vowels, which can be traced to a consonant that follows an oral vowel. For example, the nasal vowel of the word [tɔ̃] 'turn' can be traced to the nasal consonant of the English source. The nasal consonant surfaces when the word is followed by a vowel-initial word, as in [tɔ́n-ā́m] 'turn it!'.

A syllable in Naijá is constructed of a syllabic nasal, or a vowel with or without an onset or a coda consonant. Similar to English, Naijá permits onset and coda clusters. In fact, the syllable-based generalisations about Naijá are consistent with those of its main lexifier, English (Kahn 1976). Consider the examples in (4) from Faraclas (2002: 256–257).

(4) Syllable template in Naijá: $(C_1)(C_2)(C_3)$ V/N $(C_4)(C_5)$

a.	V	à	'I'	e.	N	ńgwá	'okay'
b.	CVC	kɔ́t	'cut'	f.	CVCC	tést	'test'
c.	CCV	sté	'stay'	g.	CCVVC	stat	'start'
d.	CCVCC	blást	'blast'	h.	CCCVC	strít	'street'

As we will see, the syllable structure of Naijá is crucial to the analysis of the reduplicative patterns in this work. In the next section, I present and describe the two reduplicative patterns.

3. Verbal Reduplication in Naijá

This section describes two patterns of verbal reduplication in Naijá, which are similar in terms of the segmental properties and meaning. The first pattern expresses iteration, intensity or habituation. The second pattern expresses various semantic notions that will be classified as *irregular iteration*, due the semantic variability of the derivation. The main focus of this work is the expression of irregular iteration, but it is better understood by also examining the expression of iteration. As a point of departure, I present the reduplication of verbs with open syllable.

(5) Reduplicating verbs with open syllable

		Iteration	Irregular iteration	
a.	plé	plê-plê	plè-plé	'play'
	fóló	fólò-fólò	fòlò-fóló	'follow'
	sámá	sámá-sámá	sàmà-sámá	'hit'
b.	dɛ́gè	dɛ́gè-dgɛ́gè	dɛ̀gè-dɛ́gɛ́	'pose'
	wɔ́rí	wɔ́rì-wɔ́rì	wɔ̀rì-wɔ́rí	'worry'
c.	kàkù	kàkù-kàkù	kàkù-kákú	'calculate'
	rɔ̀bɔ̀	rɔ̀bɔ̀-rɔ̀bɔ̀	rɔ̀bɔ̀-rɔ́bɔ́	'to be fat'
	dʒìgì	dʒìgì-dʒìgì	dʒìgì-dʒígí	'shake(ideo)'
d.	wàká	wàká-wàká	wàkà-wáká	'walk'
	dɛ̀tí	dɛ̀tí-dɛ̀tí	dɛ̀tì-dɛ́tí	'dirty'

As shown in (5), the verbs with open syllable are completely reduplicated to express iteration. In this case, there is a pause between each verb and its copy. For bisyllabic verbs with an H-H melody from English, the verbs and their respective copies have an H-L melody in the expression of iteration. To express that the iterated event occurs in an irregular, alternating or dispersive manner, the first copy of the verb bears an L tone on all its tone-bearing units (TBU) and the second copy of the verb bears an H tone on all its TBUs. Unlike the expression of iteration, there is no pause between the verb and its copy in the expression

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of irregular iteration. Another distinction between iteration and irregular iteration is the epenthesis of a vowel in the reduplication of closed-syllable verbs. Consider the example sets in (6).

(6) Reduplicating verbs with closed syllable

		Iteration	Irregular iteration	
a.	ʃúk	ʃûk-ʃûk	ʃùkù-ʃúkú	‘stab’
	lúk	lûk-lûk	lùkù-lúkú	‘look’
b.	slíp	sl̂ip-sl̂ip	slìpù-slípú	‘sleep’
	tʃɔ́p	tʃɔ̂p-tʃɔ̂p	tʃɔ̀pù-tʃɔ́pú	‘eat’
	tíf	tîf-tîf	tìfù-tífú	‘steal’
	lɔ́v	lɔ̂v-lɔ̂v	lɔ̀vù-lɔ́vú	‘love’
c.	púʃ	pûʃ-pûʃ	pùʃ̀ì-púʃí	‘push’
	wɔ́ʃ	wɔ̂ʃ-wɔ̂ʃ	wɔ̀ʃ̀ì-wɔ́ʃí	‘wash’
	tɔ́tʃ	tɔ̂tʃ-tɔ̂tʃ	tɔ̀tʃ̀ì-tɔ́tʃí	‘touch’
d.	kíl	kî̀l-kî̀l	kìl̀ì-kílí	‘kill’
	pɔ́t	pɔ̂t-pɔ̂t	pɔ̀t̀ì-pɔ́tí	‘port’
	brék	brêkbrêk	brèk̀ì-brékí	‘break’
	bɛ́g	bɛ̂g-bɛ̂g	bɛ̀gì-bɛ́gí	‘beg’
	blɔ́k	blɔ̂k-blɔ̂k	blɔ̀k̀ì-blɔ́kí	‘block’

For the expression of iteration, the reduplication of closed-syllable verbs patterns like the open-syllable verbs. However, for the expression of irregular iteration, the vowel [i] or [u] is epenthesised at the end of the first and the second copies of the closed-syllable verb. The choice of epenthetic vowel is determined by the preceding consonant or vowel of the verb. As shown in (6a–b), the epenthetic vowel is [u] when the preceding vowel is a high back vowel or the preceding consonant is labial. When the preceding consonant is palatal, the additional vowel is [i], as illustrated in (6c). In other environments, the epenthetic vowel is [i], as shown in (6d). The additional vowel also bears the same tone as the preceding TBU. The pattern of reduplication discussed in this work applies to words from both English and non-English sources, such as the verb [ʃúk] ‘stab’ in (6c) and the ideophone [dʒìgì] ‘shake’ in (5c).

The expression of iteration and irregular iteration applies to verbs in all varieties of Naijá. However, in the Western variety, the expression of irregular iteration has been extended to a few adverbial ideophones, such as the examples in (7). The adverbial ideophones also pattern like verbs.

(7) Reduplication of adverbial ideophones

	Iteration	Irregular iteration	
gìdìgbà	gìdìgbà-gìdìgbà	gìdìgbà-gídígbá	‘standing firm’
jàkàtà	jàkàtà-jàkàtà	jàkàtà-jákátá	‘falling flat’
gbàgà	gbàgà-gbàgà	gbàgà-gbágá	‘rickety crickety sound’

Another aspect of both iteration and irregular iteration is that they can be intensified through multiple repetition of the verbs. Consider the sentences with the expression of iteration and irregular iteration in (8–9). As shown in (8), each repetition of the verb increases the intensity of the iteration. Although the examples in (8b–d) show three repetitions, the

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verb can be repeated as many times as the speaker wishes. When there is no pause between the final copy of the repeated verb and the following word, as shown in (8d), there is no final tone-lowering on the last copy of the verb. In contrast to the expression of iteration, irregular iteration is intensified by repeating the verb in pairs for each cycle of intensification. As a result, odd numbers of verb copies, such as three or five, are not permitted, as illustrated in (9d-e). In this case, the intensified irregular iteration only functions as verb.[3] It is important to note that the present and past tenses are not marked in Naijá, so the expression of irregular iteration either has present or past tense in their verbal usage.

(8) Iteration: /fóló/ 'follow'

(a) dì pɛ́sɨ̀ **fóló** bájɔ̀
DET person follow B.
'the person followed/follows Bayọ'.

(b) dì pɛ́sɨ̀ **fólò** **fólò** sóté:
DET person follow.L follow.L until
'the person followed/follows repeatedly until…'.

(c) dì pɛ́sɨ̀ **fólò** **fólò** **fólò** sóté:
DET person follow.L follow.L follow.L
'the person followed/follows repeatedly (3x) until…'.

(d) dì pɛ́sɨ̀ **fólò** **fólò** **fóló** pàpá ɛ́̀tà
DET person follow.L follow.L follow father enter.L
'the person followed/follows repeatedly (4x) and entered with father'.

(9) Irregular iteration /wàká/ 'follow'

(a) yɔ̀ **wàkà-wáká** tú mɔ̂:tʃ fɔ̀ légɔ̀s
2.SG.POSS walk.L-**RED**.H too much LOC Lagos
'your constant walking about is too much in Lagos'.

(b) wì láík yɔ̀ **wàkà-wáká**
2.PL.SUBJ like 2.SG.POSS walk.L-**RED**.H
'we like your constant walking about'.

(c) wì **wàkà-wáká**
2.SG.SUBJ walk.L-**RED**.H
'we were constantly following about'.

(d) wì **wàkà-wáká** **wàkà-*(wáká)**
2.SG.SUBJ walk.L-**RED**.H walk.L-**RED**.H
'we were constantly walking about (2x intense)'.

(e) wì **wàkà-wáká** **wàkà-wáká** **wàkà-*(wáká)**
2.SG.SUBJ walk.L-**RED**.H walk.L-**RED**.H walk.L-**RED**.H
'we were constantly walking about (3x intense)'

[3] An example of the verbal usage of the reduplicated form is in the vocal of the song *Coffin for the Head of State* by Fela Kuti, at 11:37 time stamp of the YouTube video: https://youtu.be/HwLYHCCwGT0?t=697.

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I have described the second pattern of reduplication as expressing the semantic notion of irregular iteration, but the meaning varies by situational and linguistic contexts. For example, the meaning involves performing an action iteratively up and down, iteratively here and there, iteratively helter-skelter, incessantly anywhere and anytime, iteratively anyhow, etc. Consequently, the semantic variability is better captured as dispersive or irregular iteration. There is a phonological connection between the irregular iteration and the internally reduplicated ideophones that express semantic notions of irregularity in other Nigerian languages. As illustrated in (10), the ideophones tend to have a polar tonal melody and semantic variability. When such ideophones are incorporated into Naijá, they conform to the L-H melody like the derived irregular iteration, regardless of their tone in the source languages.

(10) Naijá ideophones expressing irregularity

	Naijá		Source	
a.	wùrù-wúrú	'fraud/roughness'	wùrù-wúrú	Igbo
	màgò-màgò	'fraud'	màgò-mágó	Hausa
b.	wɔ̀gɔ̀-wɔ́gɔ́	'crookedness'	wɔ́gɔ-wɔ̀gɔ	Yorùbá
	dʒàgà-dʒágá	'disorderly'	dʒága-dʒàga	Yorùbá
	kàtà-kátá	'disorder'	káta-kàta	Yorùbá

The reduplication of certain ideophones in Yorùbá, such as the onomatopoeias in (11), is comparable to the expression of iteration and irregular iteration in Naijá (see Fordyce 1983, Awoyale 1989). To express iteration, the onomatopoeias are completely reduplicated. To express the semantic notion of irregular iteration, the onomatopoeias are also reduplicated, but in this case, the first copy bears an L tone on its TBU, and the second copy bears an M tone on its TBU.

(11) Expressing irregularity in Yorùbá ideophones

a.	Iteration	Irregular iteration	
kpètè	kpétékpété	kpètèkpētē	'sound of mushiness'
dʒɔ̀bɔ̀	dʒɔ̀bɔ̀dʒɔ̀bɔ̀	dʒɔ̀bɔ̀dʒɔ̄bɔ̄	'flabby'
gbàgà	gbàgàgbàgà	gbàgàgbāgā	'sound of heavy object dropping'
kpékété	kpékékpékété	kpèkèkpēkē;	'sound of a small object dropping'
b.	Plural (distr)	Irregular	
kpērēsē	kpērēsēkpērēsē	kpèrèsèkpērēsē	'flat'
gbɔ̄:rɔ̄rɔ̄	gbɔ̄:rɔ̄rɔ̄gbɔ̄:rɔ̄rɔ̄	gbɔ̀:rɔ̀rɔ̀gbɔ̄:rɔ̄rɔ̄	'straight'
gbɔ̀:rɔ̀rɔ̀	gbɔ̀:rɔ̀rɔ̀gbɔ̀:rɔ̀rɔ̀	gbɔ̀:rɔ̀rɔ̀gbɔ̄:rɔ̄rɔ̄	'straight and thick'

Before turning to an analysis of the reduplicative patterns and the tone melody of the irregular iteration in Naijá, the following descriptive generalisations can be made about the patterns.

(12) Descriptive generalisations

a. *Iteration*

i. Iteration is marked via a complete reduplication of verbs

ii. The verbs can be multiply repeated

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iii. There is a pause between each verb and its copies
iv. Certain verbs and their copies undergo final-tone lowering when they occur in a prepausal position

b. *Irregular iteration*

i. Irregular iteration is also marked via a complete verb reduplication
ii. The verb and its copy can be repeated to intensify the irregular iteration
iii. The verb bears an L tone on its TBUs, and its copy bears an H tone on its TBUs
iv. The vowel [i] is epenthesised at the end of the verb and its copy- when a closed-syllable verb is reduplicated
v. The epenthetic vowel is [u] when the preceding vowel of the verb is [u] or- the preceding consonant is labial
vi. The epenthetic vowel is [i] when the preceding consonant is palatal
vii. Certain adverbial ideophones are also implicated in the expresion of irregular iteration

4. Analysis

4.1. Expressing iteration

I sketch a basic analysis of the iteration in this section, as a background to an analysis of the irregular iteration. As mentioned earlier, the expression of iteration involves a complete reduplication of verbs, and the verbs can be multiply repeated for intensity. In linguistic theory, complete reduplication is either analysed as morphological doubling or base-reduplicant correspondence. Under a doubling account, reduplication involves the repetition of a morphosyntactic unit (e.g. affix, root, stem, etc.) (Inkelas 2008). Morphological doubling can target affixes, roots, stems and phrases (Inkelas 2008: 354, Pulleyblank 2009). For a base-reduplicant account, reduplication involves copying the (sub)segmental elements of the base into RED, which is an abstract and phonologically empty morpheme (McCarthy & Prince 1993, 1995). Unlike morphological doubling, a base-reduplicant relation tends to involve morpheme-size requirement, epenthesis, assimilation and other operations that are motivated by phonological well-formedness (Inkelas 2008: 354).

Following Morphological Doubling Theory (Inkelas 2008), my account is that the expression of iteration involves the morphosyntactic doubling of a verb phrase in Naijá. The expression of iteration is schematically represented in (13). Due to selecting the same morphosyntactic identity, the daughters of the iterative reduplicative construction are semantically and phonologically identical. The syntax of morphological doubling is a property of the mother node, but the mother's meaning is an iconic function of the daughters' meaning. Given that the verbs can be multiply repeated in the expression of iteration, the account is that two or more daughters can be adjoined to a single mother. This multiple repetition is a kind of depictive reduplication (Dingemanse 2015). A similar pattern is found in the multiple repetition of the CV-shaped reduplicant in Fungwa (Akinbo 2023) and the internal/external reduplication of ideophones across languages (Dingemanse 2015, Hurch 2005).

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(13) Expression of iteration in Naijá

MOTHER	Syntax: VP	
	Semantics: iteration	
	Phonology: concatenate daughters	
DAUGHTERS	Syntax: VP	Syntax: VP
	Semantics: walk	Semantics: walk
	Phonology: wàká	Phonology: wàká

As mentioned earlier, certain verbs and each of their repetitions have final-tone lowering when they express the notion of iteration (see §3). If we consider that tone lowering only occurs before a pause in Naijá, each repetition of the verbs has to be utterance-final. The assumption in this work is that the expression of iteration involves doubling a verb phrase. An evidence that points to verb-phrase doubling is that the final iteration of the verb does not undergo a final-tone lowering when it is followed by an object, as shown in (8d). In the next section, I show that the first two copies of the verbs in the expression of irregular iteration do not involve morphological doubling but both the third and fourth copies, fifth and sixth copies (etc.) do.

4.2. Segmental properties of irregular iteration

This section accounts for the expression of irregular iteration by drawing insights from the account of iteration in the previous section. The expression of irregular iteration, unlike the expression of iteration, is not consistent with the properties of morphological doubling, considering that it involves well-formedness conditions. For example, expressing the notion of irregular iteration involves vowel epenthesis and tonal overwrite with an L-H melody. Given that the vowel epenthesis only occurs when closed-syllable verbs are reduplicated, the expression of irregular iteration has to involve a phonological well-formedness, in addition to morphosyntactic conditions. Patterns of reduplication involving phonological well-formedness conditions have been analysed as a product of the interaction between markedness and base-reduplicant correspondence constraints (McCarthy & Prince 1993, 1995, Urbanczyk 1996). Under this approach, output-output correspondence relations hold between 'the reduplicant, which is the phonological exponent of RED, and the base, which is an adjacent string that provides segmental content for the reduplicant' (Urbanczyk 1996: 16). The constraint MAX-BR drives base-reduplicant correspondence by requiring every base segment to be in correspondence with the reduplicant. In this case, MAX-BR can drive a complete copying of the base.

(14) MAX-BR (McCarthy & Prince 1995)
Every segment 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.

To account for the derivation of irregular iteration, I adopt the base-reduplicant account within Correspondence Theory (McCarthy & Prince 1993, 1995). Crucially, I assume that the derivation of irregular iteration involves two morphemes – namely, an irregular marker

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and an iteration marker. The irregular marker has an L-H tone melody, which causes the tonal alternation, as its exponent. However, the iteration marker is RED, which is a phonologically empty morpheme (McCarthy & Prince 1993, 1995). An account of the tonal alternation is presented in §4.3, but this subsection and subsequent ones only focus on the segmental property of RED. In Generalised Template Theory, the shape of RED is determined by its morphological categorisation as a root or an affix (Urbanczyk 1996). Considering that Naijá has less affixes and clitics except for pronouns, I assume that the reduplicant is categorised as a root. Another motivation for this account is that the reduplication involves complete base copying. In (15), I illustrate how the MAX-BR constraint can account for the complete reduplication in Naijá. As shown in (15), the constraint MAX-BR rules out candidates without a complete base-reduplicant correspondence.

(15) Reduplicating open-syllable verbs

Input	Output	MAX-BR
a. plé + L H **RED**	i. plè.-lé	*!
	ii. ☞ plè.-plé	
b. wàká + L H **RED**	i. wàkà.-wák	*!
	ii. ☞ wàkà.-wáká	

The descriptive generalisation in (12bii) indicates that the irregular-iteration form can be intensified by repeating the verb and its copy. This suggests that the target of intensity is neither the base nor the reduplicant but the base-reduplicant composite. Just as the expression of iteration in §4.1, the account here is that the repetition of the base and the reduplicant involves morphological doubling of the form derived in base-reduplicant relations. In this case, the base-reduplicant composite and its repetitions are daughters of a mother node. While the form derived from base-reduplicant relation can be a verb or noun, the repetition of the derived form only involves verbs. My account is that only the verbal instantiation of the base-reduplicant composite is morphologically doubled. Thus, the meaning of the mother node is an iconic function of the daughters, just like the expression of iteration. Although the daughters and mother in this case are verbs, the account is that the morphosyntax of the reduplication in morphological doubling is a property of the mother node, not the daughters. The fact that the repetition involves two copies of the verbs (and the epenthetic vowel) is in line with the account that the morphological doubling targets the forms derived from the base-reduplicant relations. This section has mainly focused on the reduplication of open-syllable verbs. In the next section, I account for the reduplication of closed-syllable verbs.

4.3. Codas and base-reduplicant relations in irregular iteration

The complete reduplication of closed-syllable verbs would have resulted in a reduplicant with a hetero- or tauto-syllabic consonant cluster, as illustrated in (16a–b). While the reduplication of CVC verbs would have resulted in a cluster with two consonants, the reduplication of CCVC verbs would have resulted in consonant clusters within the base and the reduplicant, and at the base-reduplicant juncture. The clusters can result in the violation of the constraint *CLUSTER in (17a), which prohibits adjacent consonants. To satisfy the

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constraint, there are two main options: consonant deletion and vowel epenthesis. The option of deletion is not adopted, given that the consonants of the root-internal and base-reduplicant clusters are not deleted. This suggests that the constraint MAX-IO, which requires every segment in the input to have an output correspondent, has to be ranked above *CLUSTER.

(16) Reduplicating (C)CVC

	/pís 'urinate' + L H **RED**/	/slíp 'sleep' + L H **RED**/
a.	*pìs.pís	*slìp.slíp
b.	*pì.spís	*slì.pslíp
c.	pìsì.pí.sí	slì.pì.slípí

(17) Markedness constraints (Prince & Smolensky 2004).

(a) *CLUSTER
No adjacent consonants

(b) *CODA
No Coda

We are left with the option of vowel epenthesis. Resolving the root-internal cluster with vowel epenthesis would result in the violation of the constraint CONTIGUITY, which requires adjacent segments to form a contiguous string in their input-output mapping. That the root-internal cluster is not resolved with vowel epenthesis is also considered an effect of CONTIGUITY, which has to be ranked above the constraint *CLUSTER. The surface forms, such as (16), indicate that the language prefers the option of vowel epenthesis. However, it is important to note that vowel epenthesis applies only to consonant clusters at the base-reduplicant boundary. Thus, the vowel could have been epenthesised in either the base or the reduplicant. My account is that the vowel is epenthesised in the base rather than the reduplicant. Given that MAX-BR requires base-reduplicant identity, the prediction is that the reduplicant will also copy the epenthetic vowel. This prediction holds as the final vowel of the reduplicant is similar to the epenthetic vowel. The vowel epenthesis will result in the violation of the constraint DEP-[+High], which assigns violation to an epenthetic high vowel. The constraint has to be ranked below the constraint DEP-[−High], which assigns violation to an epenthetic non-high vowel. The insertion of the vowel in the base, instead of the reduplicant, can be considered an effect of the constraint DEP-BR, which requires the segment of a reduplicant to have a correspondent in the base.

(18) Faithfulness constraints (McCarthy & Prince 1995).

(a) MAX-IO
Every segment of the input has a correspondent in the output.

(b) DEP-[−High]
Every non-high vowel of the output must have a correspondent in the input.

(c) DEP-[+High]
Every high vowel of the output must have a correspondent in the input.

(d) CONTIGUITY
Segments adjacent in the input must form a contiguous string in the output.

(e) DEP-BR
Every segment of the reduplicant has a correspondent in the base.

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The epenthesis of a base-final vowel and its subsequent copying by the reduplicant satisfy *Cluster and the constraint against codas, *Coda, at least in the context of CVC verb reduplication. Considering that the language permits any consonant as a coda, the constraint *Coda has to be ranked below *Cluster. In (19)–(20), I illustrate how these constraints can account for the segmental properties of reduplication in Naijá.

(19) / lík + L H **RED**/ → [lik̀i-**lík**í] 'constantly licking about'

	lík + L H **RED**	Max-IO	Dep-BR	Max-BR	O-Contig	*Cluster	Dep-[−H]	Dep-[+H]	*Coda
a.	lìk.-lí			*!		*			*
b.	lìk.-lík					*!			**
c.	lì.-lí	*!							
d.	lì.k-lík					*!			*
e. ☞	lì.kì.-lí.kí							*	
f.	lì.kè.-lí.ké						*!		
g.	lì.k-ì.lí.k		*!						*

(20) / brék + L H **RED**/ → [brèkì-**brék**í] 'constantly breaking things about'

	brék + L H **RED**	Max-IO	Dep-BR	Max-BR	O-Contig	*Cluster	Dep-[−H]	Dep-[+H]	*Coda
a.	brèk.-brék					***!			**
b.	brèk.-bré			*!		***			*
c.	brè.-bré	*!				**			
d.	brè.k-brék					***!			*
e.	brè.kè.-bré.ké					**	*!		
f. ☞	brè.kì.-bré.kí					**		*	
g.	brè.k-ì.bré.k		*!			**			*
h.	brè.kì.-ré.kí			*!		*		*	
i.	bì.rè.kì.-bí.ré.kí				*!			**	

The candidates in (19b, d) and (20a, d) are ruled out for fatal violations of the constraint *Cluster. The candidates in (19c) and (20c) satisfy *Cluster through base-consonant deletion but lose for violating the constraint Max-IO. The candidates in (19g) and (20g) are ruled out for violating the constraint Dep-BR. As indicated in (20i), the constraint Contiguity prevents the resolution of the consonant cluster in CCVC verbs through vowel epenthesis. By resolving the hetero-syllabic cluster through vowel epenthesis, the candidates

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in (19e) and (20f) win. As shown earlier, the epenthetic vowel is either [i] or [u], but the tableaux in (19)–(20) only contain the epenthesis of [i]. In the next section, I account for the choice of the epenthetic vowel.

4.4. Vowel epenthesis, harmony and local assimilation in irregular iteration

The preference for high vowel in epenthetic contexts is not peculiar to Naijá. Across languages, high vowels are mostly favoured in epenthetic contexts (Uffmann 2006). Phonological explanations for favouring the high vowels [i, u] as epenthetic vowels is that they are universally attested (Hume 2011). As a result of this, they are considered to be unmarked. That high vowels are mostly preferred in epenthetic contexts is considered the emergence of the unmarked (McCarthy & Prince 1994). On the perceptual side, the preference for high vowels in epenthetic contexts is due to their low sonority and perceptual weakness relative to other vowels (Howe & Pulleyblank 2004). The perceptual explanation is phonetically grounded, considering that height-based sonority directly corresponds to vowel duration, loudness and oral pressure (Parker 2002). Phonological asymmetry between high and non-high vowels are also considered an effect of perceptual salience.

(21) Relative sonority of vowels
Low vowels (æ, a…) > Mid vowels (e, o…) > High vowels (i, u…)

(22) Harmonic scale as faithfulness
DEP-Low > > DEP-Mid > > DEP-High

Howe & Pulleyblank (2004) encode the relative sonority of vowels as the constraint hierarchy shown in (22). Considering that the sonority ranking between [i] and [u] varies based on language (Parker 2002, Gordon et al. 2012), the epenthesis of the vowel [i] instead of [u] is said to involve a language-specific ranking of markedness constraints *u > > *i. By using the constraint ranking, we can account for the epenthesis of high front vowel instead of high back vowel, as illustrated in (23).

(23) /stík + L H **RED**/ → [stìkì-**stík**í] 'gum'

	stík + L H RED	DEP-[−H]	DEP-[+H]	*u	*i
a.	stì.kè.-stí.ké	*!			**
b. ☞	stì.kì.-stí.kí		*		****
c.	stì.kù.-stí.kú		*	*!*	**

Having accounted for the epenthesis of high front vowels, I now turn to the factors that determine whether [i] or [u] is epenthesised. As mentioned in §3, the choice of epenthetic vowel in the reduplicative pattern includes complex dependencies on the surrounding vowel and consonantal place. The vowel [u] is epenthesised when the preceding vowel is [u] or when the preceding consonant is labial. In general, the choice of epenthetic vowel is determined by complex interactions between vowel and consonant-vowel harmony. The same pattern is attested in the vowel epenthesis of loanword adaptation in the substrate languages (Kenstowicz 2006, Uffmann 2006). By drawing insight from the account of

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similar patterns in the substrate languages, I account for the choice of the epenthetic vowel in the reduplication of closed-syllable verbs.

The epenthesis of [u] can be considered a case of height-based rounding harmony (Kaun 2004). The height-based rounding harmony can be formally encoded as an effect of the constraint *[+Round,+High]…[−Round], which assigns violation to a high rounded vowel that is followed by an unrounded vowel. The place of articulation of the preceding consonant also determines the epenthetic vowel: the epenthetic vowel is [u] when the preceding consonant is labial. The labial harmony occurs regardless of surrounding vowels being [+Round] or [−Round]. When the preceding consonant is palatal, the height-based rounding harmony is blocked. In this case, the epenthetic vowel has to be the default vowel [i]. That the palatal consonant blocks rounding harmony can be considered the effect of the constraint *Palatal-[+Round], as defined in (24b).

(24) (a) *[+Round,+High]…[−Round]
a high round vowel must be followed by a round vowel
(b) *Palatal-[+Round]
a palatal consonant must be followed by a front vowel
(c) *Lab-[+round]
a labial consonant must be followed by a back vowel

(25) IDENT-IO
Let α be a segment in the input $\wedge$ β be a correspondent of α in the output.
If α is [γF], then β is [γF]

Given that the vowel [u] surfaces as a result of rounding harmony, the constraint *[+Round,+High]…[−Round] has to be ranked above the constraint that prohibits the vowel [u]. Instead of inserting the vowel [u], the constraint *[+Round,+High]…[−Round] could have been satisfied by fronting high vowels in the base. Given that this solution is not adopted, the constraint *[+Round,+High]…[−Round] has to be ranked below the constraint IDENT-IO. As the consonant-vowel assimilation can result in vowel disharmony, the constraint on rounding harmony has to be ranked below the constraints *Palatal-[+Round] and *Lab-[+Round], which are not crucially ranked relative to each other. In (26-28), this account is illustrated.

(26) /lúk + L H **RED**/ → [lùkù-lúkú] 'looker'

	lúk + L H **RED**	IDENT-IO	*Pal-[+Rd]	Lab-[+Rd]	[+Rd,+H]...[−Rd]	*u	*i
a.	lù.kì.-lú.kí				*!**	**	**
b. ☞	lù.kù.-lú.kú					****	
c.	lì.kì.-lí.kí	*!					****

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(27) /tíf + L H **RED**/ → [tìfù-tífú] 'thief'

	tíf + L H **RED**	IDENT-IO	*Pal-[+Rd]	Lab-[+Rd]	[+Rd,+H]...[−Rd]	*u	*i
a.	tì.fì.-tí.fí			*!*			****
b. ☞	tì.fù.-tí.fú				*	**	**
c.	tù.fù.-tú.fú	*!				****	

(28) /púʃ + L H **RED**/ → [pùʃì-púʃí] 'pusher'

	púʃ + L H **RED**	IDENT-IO	*Pal-[+Rd]	Lab-[+Rd]	[+Rd,+H]...[−Rd]	*u	*i
a.	pù.ʃù-púʃú		*!*			****	
b. ☞	pù.ʃì.-pú.ʃí				***	**	**
c.	pì.ʃì.-pí.ʃí	*!					****

The candidate that incurs a fatal violation of the constraint *[+Round,+High]…[−Round] is ruled out, as in (26a). While the candidate in (26c) satisfies *[+Round, +High]…[−Round], it is ruled out for violating the constraint IDENT-IO. The candidate in (26b) wins for satisfying the constraint on harmony to the detriment of the constraint *u. The ranking also accounts for consonant-vowel assimilations, as shown in (27) and (28). In the next section, I focus on the tones of the base and the reduplicant.

4.5. Tonal alternation of irregular iteration

Recall my assumption in §4.2 is that the expression of irregular iteration involves two morphemes – namely, iteration and irregular markers. The former and latter have RED and L-H tone melody as their respective exponents. In this sense, the L-H tone melody is a grammatical tone, which is 'a tonological operation that is not general across the phonological grammar, and is restricted to the context of a specific morpheme or construction' (Rolle 2018: 1). The tone lowering and raising of the base and reduplicant, respectively, are considered the effect of the L-H melody. I support the account that the L-H tone melody is an exponent of an irregular marker by comparing the derivation of irregular iteration to the underived ideophones that express the same meaning in Naijá and its substrate languages.

The discussion in §3 indicates that the expression of irregular iteration in Naijá shares many similarities with ideophones that inherently express irregularity in ethnic Nigerian

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languages, in terms of their polar tonal melody, reduplication and semantic variability. The association of tonal or featural polarity with the notion of irregularity is not limited to Nigerian languages but found in ideophones across languages, such as the form [lə́káy-lə̀kày] 'walk unsteadily' in Mundang (Elders 2001: 100) and the form [lăplāplv̌n] 'disorderly' in Cantonese (Hashimoto 1972: 95). Studies suggest that the alternating tone melody of the irregular ideophones is perceptually similar to the trajectory of irregular events or structures such as *zigzag* and moving *helter-skelter*, etc. Therefore, the association of alternating tone melody with the irregularity and the realisation of the tone melody is a pattern of iconicity (Fordyce 1983, Dingemanse 2011, Wallace 2019). The realisation of the L and H tones of the irregular marker on the base and reduplicant, respectively, can be considered another pattern of iconicity, as it depicts that one subcomponent of the iterated event (or entity) does not conform to the other subcomponent of the same event. Given the similarity between the tone of the irregular marker in Naijá and the tone of irregular ideophones in its substrate languages, my account is that the irregular marker in Naijá is morphophonologically modelled after the tonal and segmental properties of ideophones in the substrate languages and possibly after the form-meaning mapping principles underlying iconicity (Assaneo et al. 2011, Emmorey 2014, Dingemanse 2015). The emergence of the irregular marker from the ideophonic source is a kind of grammaticalisation.

To account for the realisation of the L-H melody, we must take into account that the base and reduplicant are morphologically categorised as root morphemes. In realising each tone of the grammatical tonal melody, we observe that the L tone is only realised on the tone-bearing units (TBUs) of the base and the H tone is only realised on the TBUs of the reduplicant. In other words, each tone of the melody never crosses a root boundary. This indicates that the tones of the irregular marker refer to a root morpheme as their domain of operation. The realisation and maximal extension of the tone melody on all TBUs of the root morphemes are considered the effect of morpheme-specific anchor constraints, which require a tone of the irregular marker to have a correspondent at edges of a root morpheme (following Finley 2009 based on McCarthy & Prince 1995). The anchor constraints are also a set of correspondence constraints like the base-reduplicant constraints. While the constraints on base-reduplicant relations regulate output-output correspondence relations, anchor constraints regulate input-output correspondence relations. The L-tone instantiations of the anchor constraints are presented in (29). The constraint L-Anchor-L assigns no violations if the L tone of the irregular marker is realised on the leftmost TBU of a root morpheme. Similarly, the constraint R-Anchor-L assigns no violations if the L tone of the irregular marker is realised on the rightmost TBU of a root morpheme. In a situation where the L tone of the irregular marker is only realised on the rightmost or medial TBU, the constraint L-Anchor-L assigns a violation to every TBU to the left of the TBU associated with the L tone. If the L tone of the irregular marker is only associated with the leftmost or medial TBU, the constraint R-Anchor-L assigns a violation to every TBU to the right of the TBU associated with the L tone. If the L tone of the grammatical tonal melody has no correspondent in the base and reduplicant, the anchor constraints assign a violation to every TBU of the base and reduplicant. I assume that the H tone versions of the anchor constraints are active in the language.

(29) L tone of an irregular marker: morphemic-feature correspondence.
  (a) L-Anchor-L
  The L tone of an irregular marker in the input must be in correspondence with the leftmost TBU of a root morpheme.

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(b) R-ANCHOR-L
The L tone of an irregular marker in the input must be in correspondence with the rightmost TBU of a root morpheme.

This account of the tonal alternation is illustrated in (30)–(31). The lexical and grammatical tones are indicated with numeral indexation. The affixation of the tone is indicated with parentheses, comparable to an autosegmental association line.

(30) /fóló + L H **RED**/ → [fòlò-fóló] 'mindless follower'

	fó$_1$ló$_1$ + L$_2$ H$_3$ **RED**	MAX-BR	L-ANCH-L	L-ANCH-H	R-ANCH-H	R-ANCH-L	IDENT-IO
a.	(fó.ló)$_1$.-(fó.ló)$_1$		*!***	*!***	*!***	*!***	
b.	(fò)$_2$.(ló)$_3$.-(fó).$_1$(ló)$_1$			*!		*!	*
c.	(fò)$_2$.(ló)$_1$.-(fó).$_3$(ló)$_1$				*!	*!	*
d.	(fò)$_2$.(ló)$_1$.-(fó).$_1$(ló)$_3$			*!		*!	*
e. ☞	(fò.lò)$_2$.-(fó.ló)$_3$						**
f.	(fò.lò)$_2$.-(fó)$_3$	*!*					**

(31) /gìdìgbà + L H **RED**/ → [gìdìgbà-gídígbá] 'irregularly firm'

	gì$_1$dì$_1$gbà$_1$ + L$_2$ H$_3$ **RED**	L-ANCH-L	L-ANCH-H	R-ANCH-H	R-ANCH-L
a.	(gì.dì.gbà)$_1$.-(gì.dì.gbà)$_1$	*!*****	*!*****	*!*****	*!*****
b.	(gì)$_2$.(dì)$_1$.(gbá)$_3$.-(gì)**.$_1$.**(dì)**$_1$.**(gbà)$_1$		*!*		*!*
c.	(gì)$_2$.(dì.gbà)$_1$.-(gì.dì)**$_1$.**(gbá)$_3$		*!*		*!*
d.	(gì)$_1$.(dì)$_2$.(gbà)$_1$.-(gì)**.$_1$.**(dí)**$_3$.**(gbà)$_1$	*!	*!	*!	*!
e.	(gì.dì)$_2$.(gbà)$_1$.-(gì)**.$_1$.**(dí.gbá)$_3$		*!		*!
f. ☞	(gì.dì.gbà)$_2$.-(gí.dí.gbá)$_3$				

The tableau in (30) shows the realisation of the grammatical tone in the reduplication of a bisyllabic verb with an H tone. The ranking rules out candidates that involve one root morpheme bearing all the grammatical tone melody, such as (30b). Despite realising the L and H tones of the irregular marker on one TBU of the base and reduplicant, respectively, the candidates in (30c–d) incur a fatal violation of the anchor constraints. Although the candidate in (30f) satisfies the anchor constraints, it is ruled out for violating MAX-BR. By realising the L and H tones of the grammatical tone on all the TBUs of the base and reduplicant, respectively, the candidate in (30e) wins. The ranking can also account for the realisation of the tone melody in the reduplication of trisyllabic words, such as the ideophone in (31). The attachment of derivational (or inflectional) affixes to ideophones is rare across languages. Most of the documented cases are from Bantu languages (Samarin 1971,

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Shangase 2001). Even in such cases, the derivational affixes are segments. This indicates that Naijá presents a rare case of derivational morphology.

Prior to this work, Faraclas (1984) presents the only known formal account of the tonal alternation found in the expression of irregular iteration in Naijá. His account of the tonal alternation is mostly based on two keen observations. The first observation, laid out in §2.1, is that stressed syllables bear an H tone when they are loaned into Naijá. This stress-to-tone mapping in Naijá is also found in the substrate languages (Kenstowicz 2006) and other languages around the world (Glewwe 2021). The other observation is that certain words bear an L tone in a final environment. Taking the observations into consideration, Faraclas (1984) argues that the L tone on the base is an effect of the final lowering, and the H tone on the reduplicant is a byproduct of the stress-to-tone mapping. Under this account, the reduplicant bearing an H tone on all its TBUs results from a phonological rule that spreads the stress-sourced H tone to all toneless TBUs. The same rule is also said to be responsible for the spreading of the final L tone to all TBUs of the base. Therefore, the tonal alternation of the irregular iteration is considered to be purely phonological.

(32) Iteration and irregular iteration

a	walk	follow	'Xed'
b.	wàká-wàká (*wàkà-wáká)	fólò-fólò (*fòlò-fóló)	'Xed iteratively'
c	wàkà-wáká	fòlò-fóló	'Xed iteratively irregular'

The account of Faraclas (1984) predicts that the tonal alternation in the expression of irregular iteration operates across all kinds of reduplication in the language. However, this is not the case, considering that the tonal alternation does not occur beyond the expression of irregular iteration, as illustrated in (32b). Contrary to the prediction of the account in Faraclas (1984), the tone lowering in Naijá only occurs utterance-finally, not medially or initially as it does for the base of the reduplication in the expression of irregular iteration. The third crucial point is that the reduplicant of an L-tone verb bears an H tone when they are involved in the expression of irregular iteration. In this case, the H tone of the reduplicant in the expression of irregular iteration cannot be traced to stress-to-tone mapping.

In general, the account of Faraclas (1984) fails to capture the descriptive generalisations of Naijá. Apart from ignoring the fact that the tonal alternation in the expression of irregular iteration is morphological, another downside of his account is that the contributions of the substrate languages are ignored. My account of the irregular iteration as a morphologically conditioned tonal alternation is more comprehensive, as it captures the general pattern in Naijá. Another advantage of my analysis is that the phonological properties of irregular iteration are consistent with similar iconic patterns in substrate languages and other languages around the world. The tone melody, as the exponent of the irregular marker, indicates that Naijá is highly influenced by its substrate languages, which are well-known for having grammatical tone (Rolle 2018). In the next section, we explore the theoretical implications of the expression of irregularity in Naijá.

5. Theoretical implications of Naijá

The account sketched in this work is that the expression of irregular iteration involves a grammatical tone which has a base-reduplicant composite as its morphological stem. I

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consider the irregular marker to be modelled after ideophones that express irregularity in the substrate languages, as a result of their shared form-meaning mapping, connection with reduplication, and semantic variability. The irregular marker does not only attach to ideophonic stems but extends to verbs in the language. In linguistic literature, ideophones and other expressive words have received little theoretical attention until recently (e.g. Haiman 2018, Dingemanse 2023), partly due to the traditional perspective that iconicity is a peripheral aspect of grammar (Hockett 1960, de Saussure 1974). However, recent studies argue for the consideration of ideophones in linguistic analysis and theory, as both iconicity and arbitrariness play crucial roles in grammar (Nuckolls 1999, Perniss et al. 2010, Dingemanse & Akita 2017, Dingemanse et al. 2015). Evidence for the new perspective about form-meaning mapping mostly comes from lexical forms and probabilistic tendency across diverse samples of world languages (Haynie et al. 2014, Thompson et al. 2021, Winter et al. 2022), but novel findings from language documentation and description indicate that certain phonological alternations are also conditioned by iconicity (Akinbo 2021a, Akinbo & Bulkaam 2024, Akinbo & Ekiugbo 2024). The irregular marker in Naijá can be considered another evidence for the modern perspective that both arbitrariness and iconicity play complementary roles in grammar. In this section, I also present additional justifications for the integration of iconicity into linguistic theory by exploring theoretical implications of the irregular marker.

The emergence of the irregular marker from ideophones expressing irregularity is crucial to the study of grammaticalisation, which involves lexical items or constructions serving grammatical functions through mechanisms such as decategorisation, context extension and phonetic erosion (Hopper & Traugott 2003, Heine 2017). Studies on grammaticalisation mostly point to arbitrary lexical forms as the origin of affixes and clitics, but recent studies include ideophones. In this case, the occurrence of ideophones in predicate structures and their capability as stems of inflectional and/or derivational affixes are considered their final stage of grammaticalisation (Heine & Kouteva 2002, Heine 2017, Andrason & Heine 2023, Heine 2023). Crucially, evidence for the involvement of ideophones in derivational morphology mostly comes from Bantu languages (Samarin 1971, Tassa 2001). The fact that the irregular marker can have ideophones as its base of derivation suggests that ideophones are also grammatically integrated in Naijá. Contrary to the hypothesis that the emergence of ideophones as affix-bearing words is their final stage of grammaticalisation, the modelling of the irregular marker after the substrate ideophones indicates that ideophones can also be grammaticalised as affixes. While the emergence of the irregular marker from ideophones as a featural affix points to decategorisation and phonetic erosion, the targeting of verbs, as well as ideophones, as the morphological stem of irregular marker points to an effect of the context-extending mechanism of grammaticalisation.

Research on iconicity in English-based contact languages, including Naijá, is mostly limited to ideophones and reduplication (e.g. Faraclas 2002, Odiegwu & Romero-Trillo 2023). While most of the ideophones in documented contact languages are said to be from the substrate languages, cognates beyond onomatopoeic words are underdocumented (Samarin 1979, Childs 1994, 1997, 2001). However, such studies rarely consider the nature of form-meaning mapping in morphophonemic alternations. Even when the studies consider phonological alternations, the source of such alternations is mostly attributed to the lexifier languages (e.g. Faraclas 1984: on the tone melody of irregular iteration). A recent study indicates that the patterns of morphemic syllable metathesis and truncation in the Wafi variety of Naijá, such as [pòló] ‘polo shirt’ vs. [lòpó] ‘unconventional negative polo shirt’

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and [bâ:g] 'bag' vs. [â:g] 'unconventional negative bag', are motivated by iconicity (see Akinbo & Ekiugbo 2024: for the basis of the iconicity). The irregular marker suggests that iconicity can motivate phonological alternations not only at the level of syllable but also at the suprasegmental level. While phonological alternations with iconicity as their motivation are under-represented in linguistic literature, the irregular marker in Naijá contributes to growing body of evidence for iconicity as a source of phonological grammar (Alderete & Kochetov 2017, Kawahara 2020, Akita 2021, Akinbo 2021a, Akinbo & Bulkaam 2024, Akinbo & Ekiugbo 2024).

Polar tonal melody, such as those of the irregular ideophones, is a pattern of phonological disharmony. In phonological theory. The preference for prosodically dissimilar adjacent segments or suprasegments across languages is considered to be perceptually motivated, as adjacent elements are easier to distinguish visually or auditorily when they possess dissimilar properties (Boersma 1998, Frisch 2004). This traditional notion of perceptual motivation in linguistic theory cannot account for phonological disharmony with iconic motivations. Indeed, iconicity research has used empirical methods to uncover iconic motivations behind phonological patterns even without reference to theory at large – for example, tonal patterns (Fordyce 1983, Thompson 2018), segmental probability (Thompson et al. 2022) and patterning of articulatory features (Johansson & Zlatev 2013, Thompson et al. 2021). To integrate iconicity into phonological theory, the concept of perceptual motivation has to be extended beyond language-internal conditions (see Taub 2001, Emmorey 2014: for discussion on structure mapping). For this reason, we have to take into account that the basis of iconicity is the perceptual resemblance between structural components of real-world elements and linguistic structure. In this sense, phonological alternations with iconicity as their motivation are perceptually motivated. Therefore, the irregular marker supports extending the notion of perceptual motivation in phonological theory to include the cross-modal depiction of sensory imagery (Akinbo & Bulkaam 2024, Akinbo & Ekiugbo 2024).

The integration of iconicity into grammar has implications for various models of grammar, especially the hypothesis that knowledge of linguistic rules, constraints and conditions are innate properties of a language-specific cognitive capability (Chomsky 1965, Chomsky & Halle 1968). Therefore, the prediction is that phonological patterns with iconic motivations are innate. The prediction does not hold, considering the diversity of iconicity and the linguistic ability to phonologically depict new events or entities (e.g. creation of new onomatopoeias for novel sound events (Assaneo et al. 2011, Bezat et al. 2014, Taitz et al. 2018)). Iconicity, as a process of mapping structural components of real-world entities or events to linguistic form (Emmorey 2014), is consistent with the proposal of Emergent Grammar that grammar emerges from domain-general cognitive properties such as memory, paying attention to details and similarities (Hopper 1987, Bybee 2003, Archangeli & Pulleyblank 2022). Although the proposal is based on descriptive morphophonological patterns, it can be extended to depictive modes of signification such as iconic reduplication and phonological disharmony. For instance, the vocal depiction of a perceived event, such as a rock falling into water causing a splash, has to involve paying attention to the structural components of the event and its similarity with other events (see Thompson & Do 2019 for such an analysis of ideophones), regardless of their modality. Similar crossmodal mappings are found in musical traditions with speech surrogates, in which phonetic and phonological structures of words are imitated with musical melody and vice versa (McPherson 2018, Seifart et al. 2018, Akinbo 2019, 2021b, Durojaye et al. 2021, James 2021). In this sense, the form-meaning mapping of musical speech surrogate is partly

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comparable to onomatopoeia. Based on these similarities between form-meaning mapping in musical speech surrogate and language, phonological alternations with iconic motivation, such as the tonal melody of the irregular marker in Naijá, points to domain-general cognitive processes as the source of language. Evidence from brain-imagery studies on music cognition and iconicity, such as Koelsch et al. (2004), Kanero et al. (2014) and Brown et al. (2006), supports the hypothesis that language shares cognitive resources with other modalities.

A recurrent theme regarding creoles is that they evolve by simplifying the grammar of their donor languages, often resulting in minimal use of lexical tone, if any, and rarely employing grammatical tone (Samarin 1979, Bickerton 1981, McWhorter 2001). Yakpo (2021) challenges the claim that tone loss or reduction is a feature of creolisation by citing numerous examples of lexical and grammatical tones in Pichi, Guyanese Creole and other creoles around the world. Like these English-based contact languages, Naijá also has highly productive lexical and grammatical tones (Faraclas 1984, Akinbo & Ekiugbo 2024). The tonal alternation in the expression of irregularity presents additional evidence for the existence of complex tone systems in creoles. Notably, the expression of irregularity in Naijá is comparable to the patterns of tonal alternation in Guyanese Creole (Devonish & Thompson 2010: 11, cited in Yakpo 2021) and Pichi in terms of tone melody pattern, syntax, and semantics (Yakpo 2019: 92–100). Considering that iconic grammatical tones are under-documented across languages, the irregular marker in Naijá contributes to the typology of grammatical tone in contact languages.

6. Summary and Conclusion

I have described and analysed two patterns of reduplication in Naijá, in which the second pattern is intertwined with a pattern of tonal alternation. In the first pattern, the language expresses iteration through a complete reduplication of verbs. The verb can be multiply iterated. In the second pattern of reduplication, which is the main focus of this work, Naijá expresses irregular iteration through a complete reduplication of verbs. When the verb has a closed syllable, an additional vowel is added to the base and its reduplicant. Regardless of the tone of the verb, the verb base alongside the additional vowel (if any) bears an L tone on all its TBUs, and the TBUs of the reduplicant bear an H tone. The base-reduplicant composite in the expression of irregular iteration can be multiple iterated.

The expression of iteration is analysed as morphological doubling of a verb phrase. Multiple iteration of verbs in the expression of intensity is considered an effect of multiple morphological doubling. For the expression of irregular iteration, the tonal alternation and reduplication are considered the results of two morphemes – namely, irregular and iteration markers. In this case, the irregular maker has an L-H-tone melody as its exponent, and the iteration marker is RED, which is a phonologically empty morpheme. The realisation of the tone melody and RED are byproducts of independent and interacting constraints. The epenthetic vowel is conditioned by consonant-cluster resolution and (consonant-)vowel harmony. Similar to the expression of iteration, the expression of irregular iteration through the base-reduplicant relation can be intensified through morphological doubling. The morphophonological properties of the two reduplicative patterns are consistent with cross-linguistic patterns of iconicity, supporting the emerging perspective that both arbitrariness and iconicity are integral aspects of grammar in Naijá. The tone melody of the irregular

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iteration is comparable to that of ideophones in its main ethnic lexifiers, suggesting that the substrate ideophones and crossmodal perception sensory imagery are the sources of the irregular marker. This indicates that iconicity can contribute to grammaticalisation and grammatical expansion.

The account of the irregular iteration presented in this work is contrary to that of previous research, which attributes the tone melody of the reduplication to the main lexical donor and general phonological rules (Faraclas 1984). If we consider that, until recently, certain features of pidgins and creoles, including iconicity, have been mostly attributed to Universal Grammar (Bickerton 1981, Kouwenberg & LaCharité 2003), it is likely that substrate-influenced iconicity beyond lexicalised ideophones is underdocumented. Future research on morphophonemic processes in pidgins and creoles should focus on the nature of form-meaning association. Most importantly, the present work contributes to the typology of iconic patterns and grammatical tones across languages.

References

Akinbo, Samuel Kayode. 2019. Representation of Yorùbá tones by a talking drum: An acoustic analysis. *Linguistique et Langues Africaines*. 11–23.

Akinbo, Samuel Kayode. 2021a. Featural affixation and sound symbolism in Fungwa. *Phonology.* 38(4). 537–569.

Akinbo, Samuel Kayode. 2021b. The language of gángan, a Yorùbá talking drum. *Frontiers in Communication.* 6. 650382.

Akinbo, Samuel Kayode. 2023. Reduplication, repetition and sound symbolism in Fungwa. *Phonological Data and Analysis.* 5. 1–24. https://doi.org/10.7365/pda.v5art2.72.

Akinbo, Samuel Kayode & Michael Bulkaam. 2024. Iconicity as the motivation for the signification and locality of deictic grammatical tones in Tal. *Glossa: A Journal of General Linguistics.* 9(1).

Akinbo, Samuel Kayode & Philip Oghenesuowho Ekiugbo. 2024. Iconicity as the motivation for morphophonological metathesis and truncation in Nigerian Pidgin. *Open Linguistics.* 10(1). 20240013.

Akita, Kimi. 2021. A typology of depiction marking: The prosody of Japanese ideophones and beyond. *Studies in Language.* 45(4). 865–886.

Alderete, John & Alexei Kochetov. 2017. Integrating sound symbolism with core grammar: The case of expressive palatalization. *Language.* 93(4). 731–766.

Andrason, Alexander & Bernd Heine. 2023. On the grammaticalization of ideophones. In Sylvie Hancil & Vittorio Tantucci (eds.), *Different slants on grammaticalization*, vol. 232, 237–262. Amsterdam/Philadelphia: John Benjamins.

Archangeli, Diana & Douglas Pulleyblank. 2022. *Emergent phonology.* Berlin: Language Science Press.

Assaneo, Mara Florencia, Juan Ignacio Nichols & Marcos Alberto Trevisan. 2011. The anatomy of onomatopoeia. *PloS One.* 6(12). e28317.

Awoyale, Yiwola. 1989. Reduplication and the status of ideophones in Yoruba. *Journal of West African Languages.* 19(1). 15–34.

Bakker, Peter. 2008. Pidgins versus creoles and pidgincreoles. In Silvia Kouwenberg & John Victor Singler (eds.), *The handbook of pidgin and creole studies*, 130–157. West-Sussex: Wiley Blackwell.

Bezat, Marie-Céline, Richard Kronland-Martinet, Vincent Roussarie & Sølvi Ystad. 2014. From acoustic descriptors to evoked quality of car door sounds. *The Journal of the Acoustical Society of America.* 136(1). 226–241.

Bickerton, Derek. 1981. *Roots of language*. Ann Arbor, MI: Karoma.

Boersma, Paul. 1998. *Functional phonology.* University of Amsterdam PhD thesis.

Brown, Steven, Michael J. Martinez & Lawrence M. Parsons. 2006. Music and language side by side in the brain: A PET study of the generation of melodies and sentences. *European Journal of Neuroscience.* 23. 2791–2803.

Bybee, Joan. 2003. *Phonology and language use*, vol. 94. Cambridge: Cambridge University Press.

Childs, G. Tucker. 1994. Expressiveness in contact situations: The fate of African ideophones. *Journal of Pidgin and Creole Languages.* 9(2). 257–282.

https://doi.org/10.1017/S0022226724000276 Published online by Cambridge University Press

Childs, G. Tucker. 1997. The status of Isicamtho, an Nguni-based urban variety of Soweto. In Arthur K. Spears & Donald Winford (eds.), *The structure and status of pidgins and creoles*, 341–372. Amsterdam/Philadelphia: John Benjamins.

Childs, G. Tucker. 2001. Research on ideophones, whither hence?: The need for a social theory of ideophones. In F. K. Erhard Voeltz & Christa Kilian-Hatz (eds.), *Ideophones*, vol. 44, 63–73. Amsterdam/Philadelphia: John Benjamins.

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam & Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.

Devonish, Hubert & Dahlia Thompson. 2010. *A concise grammar of Guyanese Creole (Creolese)*. München: Lincom Europa.

Dingemanse, Mark. 2011. *The meaning and use of ideophones in Siwu.* Radboud University Nijmegen Nijmegen PhD thesis.

Dingemanse, Mark. 2015. Ideophones and reduplication: Depiction, description, and the interpretation of repeated talk in discourse. *Studies in Language.* 39(4). 946–970.

Dingemanse, Mark. 2023. Ideophones. In Eva van Lier (ed.), *The oxford handbook of word classes*, Oxford: Oxford University Press.

Dingemanse, Mark. to appear. Ideophones. In Eva van Lier (ed.), *The oxford handbook of word classes*, Oxford: Oxford University Press. doi:https://doi.org/10.31234/osf.io/u96z.

Dingemanse, Mark & Kimi Akita. 2017. An inverse relation between expressiveness and grammatical integration: On the morphosyntactic typology of ideophones, with special reference to Japanese. *Journal of Linguistics.* 53 (3). 501–532.

Dingemanse, Mark, Damián E. Blasi, Gary Lupyan, Morten H. Christiansen & Padraic Monaghan. 2015. Arbitrariness, iconicity, and systematicity in language. *Trends in Cognitive Sciences.* 19(10). 603–615.

Durojaye, Cecilia, Kristina L. Knowles, K. Jakob Patten, Mordecai J. Garcia & Michael K. McBeath. 2021. When music speaks: An acoustic study of the speech surrogacy of the Nigerian dùndùn talking drum. *Frontiers in Communication.* 6. 652690.

Elders, Stefan. 2001. Defining ideophones in Mundang. In F. K. Erhard Voeltz & Christa Kilian-Hatz (eds.), *Ideophones*, vol. 44, 97–110. Amsterdam/Philadelphia: John Benjamins.

Elugbe, Ben Ohiọmamhẹ & Augusta Phil Omamor. 1991. *Nigerian pidgin: Background and prospects*. Ibadan, Nigeria: Heinemann Educational Books.

Emmorey, Karen. 2014. Iconicity as structure mapping. *Philosophical Transactions of the Royal Society B: Biological Sciences.* 369(1651). 20130301.

Esizimetor, David Oshorenoya. 2010. Historical development of Naijá. In *A paper presented at the Conference on Nigerian Pidgin, University of Ibadan, Nigeria, 8——9 July, 2009*, Institut Français de Recherche en Afrique (IFRA).

Faraclas, Nicholas. 1984. Rivers pidgin English: Tone, stress, or pitch-accent language? *Studies in the Linguistic Sciences.* 14(2). 67–76.

Faraclas, Nicholas. 2002. *Nigerian pidgin*. London/New York: Routledge.

Faraclas, Nicholas. 2021. Naija: A language of the future. In Akinmade T. Akande & Oladipo Salami (eds.), *Current trends in Nigerian Pidgin English: A sociolinguistic perspective*, 9–38. Berlin: De Gruyter Mouton.

Finley, Sara. 2009. Morphemic harmony as featural correspondence. *Lingua.* 119(3). 478–501.

Fordyce, James F. 1983. The ideophone as a phonosemantic class: The case of Yoruba. In Ivan R. Dihoff (ed.), *Current approaches to african linguistics*, vol. 1, 263–278. Dordrecht: Foris.

Frisch, Stefan A. 2004. Language processing and segmental ocp effects. In Bruce Hayes, Robbert Kirchner & Steriade Donca (eds.), *Phonetically based phonology*, vol. 346, 346–371. Cambridge: Cambridge University Press.

Glewwe, Eleanor. 2021. The phonological determinants of tone in English loanwords in Mandarin. *Phonology.* 38(2). 203–239.

Gordon, Matthew, Edita Ghushchyan, Bradley McDonnell, Daisy Rosenblum & Patricia A. Shaw. 2012. Sonority and central vowels: A cross-linguistic phonetic study. 219–256.

Haiman, John. 2018. *Ideophones and the evolution of language*. Cambridge: Cambridge University Press.

Hashimoto, Oi-kan Yue. 1972. *Phonology of cantonese*, vol. 1. Cambridge: Cambridge University Press.

Haynie, Hannah, Claire Bowern & Hannah LaPalombara. 2014. Sound symbolism in the languages of australia. *PLoS One.* 9(4). e92852.

Heine, Bernd. 2017. Grammaticalization. In Brian D. Joseph, Richard D. Janda & Barbara S. Vance (eds.), *The handbook of historical linguistics*, 573–601. New York: Wiley.

Heine, Bernd. 2023. *The grammar of interactives*. Oxford: Oxford University Press.
Heine, Bernd & Tania Kouteva. 2002. *World lexicon of grammaticalization*. Cambridge: Cambridge University Press.
Hockett, Charles F. 1960. The origin of speech. *Scientific American.* 203(3). 88–97.
Hopper, Paul. 1987. Emergent grammar. In Jon Aske, Natasha Beery, Laura Michaelis & Filip Hana (eds.), *Annual meeting of the Berkeley Linguistics Society*, vol. 13, 139–157. Berkley, CA: Berkeley Linguistics Society.
Hopper, Paul J. & Elizabeth Closs Traugott. 2003. *Grammaticalization*. Cambridge: Cambridge University Press.
Howe, Darin & Douglas Pulleyblank. 2004. Harmonic scales as faithfulness. *Canadian Journal of Linguistics/ Revue Canadienne de Linguistique.* 49(1). 1–49.
Hume, Elizabeth. 2011. Markedness. In Colin J. Ewen Marc, Elizabeth V. Hume & Keren Rice (eds.), *Companion to phonology*, vol. 5, 80–105. Malden, MA: Wiley-Blackwell.
Hurch, Bernhard. 2005. *Studies on reduplication*. Berlin: Mount de Gruyter.
Ibarretxe-Antuñano, Iraide. 2017. Basque ideophones from a typological perspective. *Canadian Journal of Linguistics/Revue Canadienne de Linguistique.* 62(2). 196–220.
Inkelas, Sharon. 2008. The dual theory of reduplication. *Linguistics.* 46(2). 351–401.
James, Lucas. 2021. Systems of communication: Aspects of culture and structure in speech surrogates. *Frontiers in Communication.* 6. 653268.
Johansson, Niklas & Jordan Zlatev. 2013. Motivations for sound symbolism in spatial deixis: A typological study of 101 languages. *The Public Journal of Semiotics.* 5(1). 1–20.
Kahn, Daniel. 1976. *Syllable-based generalizations in English phonology.* Massachusetts Institute of Technology PhD thesis.
Kanero, Junko, Mutsumi Imai, Jiro Okuda, Hiroyuki Okada & Tetsuya Matsuda. 2014. How sound symbolism is processed in the brain: A study on Japanese mimetic words. *PLoS One.* 9(5). e97905.
Kaun, Abigail. 2004. The typology of rounding harmony. In Barnard Sawyer Bronson (ed.), *Phonetically based phonology*, 87–116. Cambridge: Cambridge University Press.
Kawahara, Shigeto. 2020. Sound symbolism and theoretical phonology. *Language and Linguistics Compass.* 14(8). e12372.
Kenstowicz, Michael. 2006. Tone loans: The adaptation of English loanwords into Yoruba. In *Selected proceedings of the 35th annual conference on african linguistics*, 136–146. Cascadilla Proceedings Project Somerville, MA.
Koelsch, Stefan, Elisabeth Kasper, Daniela Sammler, Katrin Schulze, Thomas Gunter & Angela D. Friederici. 2004. Music, language and meaning: Brain signatures of semantic processing. *Nature Neuroscience.* 7. 302–307.
Kouwenberg, Silvia & Darlene LaCharité. 2003. The meanings of 'more of the same': Iconicity in reduplication and the evidence for substrate transfer in the genesis of caribbean creole languages. In Silvia Kouwenberg (ed.), *Twice as meaningful: Reduplication in pidgins, creoles and other contact languages*, 7–18. London: Battlebridge.
McCarthy, John J. & Alan Prince. 1993. Prosodic morphology: Constraint interaction and satisfaction. University of Massachusetts manuscript.
McCarthy, John J. & Alan Prince. 1994. The emergence of the unmarked: Optimality in prosodic morphology. In Mercè Gonzàlez (ed.), *Proceedings of the North East Linguistic Society*, 333–379. Amherst, MA: Graduate Linguistic Student Association.
McCarthy, John J. & Alan Prince. 1995. Faithfulness and reduplicative identity. In Jill N. Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.), *Papers in Optimality Theory*, 249–384. GLSA.
McPherson, Laura. 2018. The Talking balafon of the Sambla: Grammatical principles and documentary implications. *Anthropological Linguistics.* 60(3). 255–294.
McWhorter, John H. 2001. The worlds simplest grammars are creole grammars. *Linguistic Typology.* 125–166.
Norde, Muriel *et al.* 2002. The final stages of grammaticalization: Affixhood and beyond. In lse Wischer & Gabriele Diewald (eds.), *New reflections on grammaticalization*, 45–65. Amsterdam/Philadelphia: John Benjamins.
Nuckolls, Janis B. 1999. The case for sound symbolism. *Annual Review of Anthropology.* 28(1). 225–252.
Odiegwu, Nancy Chiagolum & Jesús Romero-Trillo. 2023. Gradience in iconicity: Evidence from total reduplicative constructions in Nigerian Pidgin. *Review of Cognitive Linguistics.*
Parker, Stephen G. 2002. *Quantifying the sonority hierarchy.* University of Massachusetts PhD thesis.
Perniss, Pamela, Robin L. Thompson & Gabriella Vigliocco. 2010. Iconicity as a general property of language: Evidence from spoken and signed languages. *Frontiers in Psychology.* 1. 227.
Prince, Alan & Paul Smolensky. 2004. *Optimality theory: Constraint interaction in generative grammar*. Malden, MA: Wiley-Blackwell.

https://doi.org/10.1017/S0022226724000276 Published online by Cambridge University Press

Pulleyblank, Douglas. 2009. Patterns of reduplication in Yoruba. In Kristin Hanson & Sharon Inkelas (eds.), *The nature of the word: Essays in honor of Paul Kiparsky*, 311–357. Cambridge, MA: MIT Press.
Rolle, Nicholas Revett. 2018. *Grammatical tone: Typology and theory.* University of California, Berkeley PhD thesis.
Samarin, William J. 1971. Survey of Bantu ideophones. *African Language Studies.* 12.
Samarin, William J. 1979. Simplification, pidginization, and language change. In Ian F. Hancock (ed.), *Readings in creole studies*, 55–68. Amsterdam/Philadelphia: John Benjamins.
de Saussure, Ferdinand. 1974. *Course in general linguistics*. London: Fontana.
Seifart, Frank, Julien Meyer, Sven Grawunder & Laure Dentel. 2018. Reducing language to rhythm: Amazonian Bora drummed language exploits speech rhythm for long-distance communication. *Royal Society Open Science.* 5(4). 170354.
Shangase, Sibusiso Elphus. 2001. *The non-productive verbal extensions in Zulu: A study in derivational morphology.* University of Natal, Durban PhD thesis.
Taitz, Alan, M. Florencia Assaneo, Natalia Elisei, Mónica Trpodi, Laurent Cohen, Jacobo D. Sitt & Marcos A. Trevisan. 2018. The audiovisual structure of onomatopoeias: An intrusion of real-world physics in lexical creation. *PloS One* 13(3). e0193466.
Tassa, Okombe-Lukumbu. 2001. La formation des radicaux déidéophonique et des idéophones déverbatifs en Tetela (dialecte Ewango). In F. K. Erhard Voeltz & Christa Kilian-Hatz (eds.), *Ideophones*, vol. 44, 375–384. Amsterdam/Philadelphia: John Benjamins.
Taub, Sarah F. 2001. *Language from the body: Iconicity and metaphor in American Sign Language*. Cambridge: Cambridge University Press.
Thompson, Arthur L., May Pik Yu Chan, Ping Hei Yeung & Youngah Do. 2022. Structural markedness and depiction: The case of lower sequential predictability in Cantonese ideophones. *The Mental Lexicon.* 17(2). 300–324.
Thompson, Arthur Lewis. 2018. Are tones in the expressive lexicon iconic? Evidence from three Chinese languages. *PloS One.* 13(12). e0204270.
Thompson, Arthur Lewis & Youngah Do. 2019. Defining iconicity: An articulation-based methodology for explaining the phonological structure of ideophones. *Glossa: A Journal of General Linguistics.* 4(1). 1–40.
Thompson, Arthur Lewis, Thomas Van Hoey & Youngah Do. 2021. Articulatory features of phonemes pattern to iconic meanings: Evidence from cross-linguistic ideophones. *Cognitive Linguistics.* 32(4). 563–608.
Uffmann, Christian. 2006. Epenthetic vowel quality in loanwords: Empirical and formal issues. *Lingua.* 116(7). 1079–1111.
Urbanczyk, Suzanne Claire. 1996. *Patterns of reduplication in Lushootseed.* University of Massachusett, Amherst PhD thesis.
Wallace, Ted Jansson. 2019. *A study in flim-flam: Reduplicative ablaut ideophones in English*. Lund University BA thesis.
Williamson, Kay. 1984. *Practical orthography in Nigeria*. Ibadan: Heinemann Educational Books.
Winter, Bodo, Márton Sóskuthy, Marcus Perlman & Mark Dingemanse. 2022. Trilled/r/is associated with roughness, linking sound and touch across spoken languages. *Scientific Reports.* 12(1). 1–11.
Yakpo, Kofi. 2019. *A grammar of Pichi*. Berlin: Language Science Press.
Yakpo, Kofi. 2021. Creole prosodic systems are areal, not simple. *Frontiers in Psychology.* 12. 690593.

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