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Iambic Templates in Hausa Morphology[1]

Resumé

Le travail presenté veut cerner le rôle du pied ïambique pour le haoussa, une langue tchadique tonale qui est la langue maternelle pour environ 30 mln des usagés au nord du Nigeria et au sud du Niger. Elle est aussi parlée par 30 mln des habitants des territoires qui s'étendent de l'Afrique de l'Ouest jusqu'au Soudan.

Proposant les analyses diachronique et synchronique de deux classes de mots (celle du nom et celle du verbe) de la langue haoussa, nous supposons que son caractère ïambique, bien qu'il n'influence pas directement sur la distribution de tons, détermine considérablement sa morphologie. Ainsi, le pied ïambique devient, avec la structure tonale, l'un des deux sous-systèmes de la prosodie de la langue haoussa.

Du côté de la forme, ce travail est basé sur la Théorie de l'optimalité. Néanmoins, nous nous éloignons du modèle standard en formulant directement les conditions prosodiques portant sur la taille de la lexie.

1. Introduction

Metrical theory, grounded in extra-linguistic, rhythmic pheno-mena found in music and verse recitation, was designed primarily to account for the placement of stress accent (Liberman & Prince 1977; Hayes, 1985, 1995). However, its role has proved to be essential

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beyond that: still dealing with word prosody, metrical structure may condition the distribution of tones – languages exhibiting such rhythmic alternations occupy the middle ground between the proto-typical tone, and stress accent systems, and are traditionally claimed to have a "rhythmic", or "pitch accent". Certain parts of morphology can likewise be defined by metrical structure. In particular, as observed by McCarthy & Prince (1990, 1993a, 1996), the forms shaped by some language-universal morphological processes make reference to language's prosodic structure, and thus are bound to surface on the basis of a prosodically specified template. One of the default constituents called on by Prosodic Morphology, is a metrical foot.

The following study focuses on tracing the role of metrical structure in Hausa – an Afroasiatic language belonging to the Chadic group, native to around 30 million people in northern Nigeria and southern Niger, and used by some further 30 million speakers in West Africa and as far east as Sudan. This work aims specifically at providing synchronic and diachronic evidence for the role of iambic foot in shaping Hausa morphology.

1.1 Word-prosody and prosodic morphology

It has already been mentioned that the role of metrical structure is not restricted to stress phenomena, as it also affects those prosodic systems which do not reveal a unique, obligatory surface prominence at a word-level. Indeed, tonal patterns of a language may be distributionally conditioned by metrical feet in multiple ways. For example, while Seneca (Chafe 1996) associates high tone only to the heads of metrical feet, Yoruba (Awoyale 2000) allows tones to spread within the foot, making it the tone bearing unit if several conditions are met. Needless to say, the range of possibilities for the extent of utilizing metrical foot is so wide cross-linguistically, that the notion of "pitch-accent" itself, which has traditionally referred to such cases, was recently rejected by Hyman (2006, 2008) as opaque.

Metrical structure has been furthermore argued to determine morphology: McCarthy and Prince (1996) observe that templatic morphological processes (such as reduplication, Semitic-type word formation, truncation) are defined solely in terms of prosodic struc-

ture and thus refer directly to such constituents as Prosodic Word (PrWd), metrical foot (Ft), and a syllable (σ), which can be either light (i.e. monomoraic: σ_μ) or heavy (bimoraic: $\sigma_{\mu\mu}$). According to the authors, "the fact that the templates are bounded by a language's prosody follows from their being literally built from that prosody" (McCarthy and Prince 1996:5). Regarding the role of metrical structure in shaping templatic morphology, Hayes (1995:47) states that: "typically (though not universally), the kind of foot required by a language's morphological system is the same as that required by its stress system". This can be illustrated by reduplication in Manam (Lichtenberk 1983):

(1) **salága**   **salagalága**   'long'
     moíta   **moitaíta**   'knife'
     malabóŋ   **malabombóŋ**   'flying fox'
     ulán   **ulanlán**   'desire'

Manam is a quantity-sensitive language with a light (CV) vs. heavy (CVV/CVC) syllable distinction. Stress generally falls on the head of the rightmost moraic trochee, it is either ($\acute{\sigma}_\mu$ σ_μ) as in **sa(lága)**, or ($\acute{\sigma}_{\mu\mu}$) as in **u(lán)**. Consequently, as predicted by Hayes, the shape of the suffixal reduplicant (underlined in the examples above) is defined in terms of the trochaic foot: **salaga(lága)**, **ulan(lán)**.

Similarly, Yup'ik proximal vocatives are built on the basis of a mono- or disyllabic right-headed (i.e. iambic) foot, which refers directly to the requirements posed by the accent system of the language, whereby heads are marked with the raised pitch (($\acute{\sigma}_{\mu\mu}$) or (σ_μ $\acute{\sigma}_{\mu\mu}$); for a full discussion see Woodbury 1985 and McCarthy & Prince 1996):

(2) Full noun   Proximal vocative

     (A. ŋív)(ɣán)   **(A. ŋíf)**

     (Qə.tún)(ɣáq)   **(Qə́t) = (Qə.tún)**

Putting Hausa within the frames of the metrical theory as sketched above, we shall argue that, while the distribution of its tones is not overtly strictured by metrical feet, the language reveals high sensitivity to the latter in shaping its morphology.

Before the argument, we highlight the basic facts concerning Hausa prosody.

1.2 The prosodic subsystems

Two prosodic principles – tone and syllable weight – are engaged in shaping Hausa phonology and morphology. Below we briefly characterize these notions.

1.2.1 Tone

Hausa has two contrastive level tones, high (H), e.g. **ǰíníí**[2] 'blood' and low, (L), e.g. **ʔàkʷààtì** 'box', in which a syllable stands for a Tone Bearing Unit. A falling tone (F), realized only on heavy, bimoraic syllables, e.g. **sáà** 'bull', is also regarded a distinct toneme, yet the lack of rising tones in the language suggests that the falling contour is historically derived.

The functional load of Hausa tone is not as high as in some Niger-Congo languages like Yoruba or Igbo, yet it is lexically distinctive, as may be illustrated by around one hundred minimal pairs to be found in the language (Pawlak, 1989). Compare the following:

(3)

H vs L		F vs. H	
wááwàà	'fool'	**kâi**	'head'
wààwáá	'many (people)'	**kái**	'you (m.)'

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[2] The conventional orthography used by Hausaists has been slightly modified here for the special needs of the study: to avoid confusion with consonant clusters, glottalized and palatalized consonants **kw**, **gw** , **ky**, **gy** are transcribed as [**kʷ, gʷ, kʸ, gʸ**], while [**s', š**] are used for an ejective sibilant and a palato-alveolar fricative - **ts** and **sh** – respectively. To parallel the latter, palato-alveolar affricates (spelled **c** , **j** in Hausa grammars) are transcribed as [**č, ǰ**]. Finally, [**ʔ**] stands for phonemic glottal stop, which is conventionally not represented in word-initial position, and marked as **'** elsewhere. Grave and acute accents stand for low and high tones respectively.

However, the grammatical function of tone is far more significant. For example, it can inflect nouns for plurality, e.g. **màátáá** 'wife' cf. **máátáá** 'wives', 'women'; form verbal nouns, e.g. **šáá** 'to drink' cf. **šáà** 'drinking'; modify the meaning of verbs (by changing the 'grade'), e.g. **zái hàɽbéé tà** 'he will shoot at her' cf. **táá háɽbèè nàmíĵìì** 'she shot the husband dead'; mark tense / aspect / mood, e.g. **táášì** 'to get up' cf. **tààšì** 'get up!' (imperative).

1.2.2 Syllable weight

Hausa divides syllables into light and heavy, where monomoraic CV stands for a light syllable, while the heavy class includes bimoraic CVV (the nucleus being either a long vowel or a diphthong) and CVC with a coda consonant. Syllable weight is lexically distinctive, cf .**gà.ɽíí** 'town' vs. **gàà.ɽíí** 'millet'; **fá.sàà** 'to break sth' vs. **fáá.sàà** 'to put sth. off'. Likewise, it serves a number of grammatical functions. As argued below, most of them engage metrical structure, and in particular, an iambic foot.

1.3 The question of metrical foot in Hausa

In her survey of African accent systems, Downing (2004) observes that Chadic languages – including Hausa – provide the least tangible evidence for the presence of a metrical accent among the Afroasiatic family. However, while all the Chadic languages are indeed tonal, recent findings may attract research to analyze them in the light of metrical theory. So far the most thoroughly described in this respect is Kera (Pearce 2006, 2007), in which the iambic foot not only shapes word structure, but also serves as a domain for vowel harmony and interacts with tone in a way which is as much subtle as crucial for understanding the tonal system of the language. The foot-tone interaction reveals its not evident presence in Kera in words containing more than two syllables, where – with a few exceptions – each iamb is associated with only one of the three tones, i.e. a tone links to the head and spreads left to the non-head), cf. (**gə̀.dàà**)(**mɔ́ɔ́**) (type of bird), (**sáá**)(**tɔ̄.rāw**) 'cat' (non-heads avoid H-tone spreading – instead M occurs by default, e.g. (**kɔ̄.kám**)(**náá**).

25

As for Hausa, it is worth pointing out that stress accent itself (represented as an acoustic feature) was reported in its earlier grammars, before the linguists established the crucial link between stress placement and metrical structure. For example, Migeod (1914:1) describes Hausa without any reference to tone, stating that "the stress accent is as a general rule on the penultimate syllable" with a partly conditioned switch to the immediately preceding / following syllable. Nearly three decades later, Abraham (1941) analyzed Hausa as a tonal language with "an intimate connection between stress and tone" (Abraham 1941:141). Similar claim was made by Kraft & Kirk-Greene (1973). However, the discussion was cut short by Dresel's (1977) phonetic study, which has shown that there is no prominence marked by intensity at the word level, and that the two other usual correlates of stress, i.e. high pitch and long duration, may coincide on one syllable, but their co-occurrence is hardly predictable and by no means automatic. Ever since, Hausa is described as a purely tonal language.

The misrepresentation of Hausa prosody by the earlier scholars parallels other African tone languages described previously as exhibiting stress accent, and can be explained as rooted in the inappropriate theoretical apparatus employed – influenced by the accentual, native language of the researcher. Downing (2004:102) states that "tone has been notoriously underdescribed for African languages as it is often considered 'too hard to hear' by non-native speakers of tone languages".

On the other hand, Newman (1973) emphasizes the role of syllable weight in Hausa grammar, devoting large part of the paper to plural formation. Interestingly, McCarthy and Prince (1996:8) note that "iambic rhythm is crucially dependent upon the appearance of heavy syllable in a language". Similarly, in his encyclopedic reference grammar (which contains no discussion of stress), Newman (2000) uses the notion of "rhythmic weight polarity", mostly with reference to plural nouns and denominal verbs. Let us observe that rhythmic polarity clearly points to the presence of a quantity-sensitive metrical structure, most notably to an iambic foot which, as seen above, tends to enhance durational contrasts. Significantly, di-

rect reference to foot structure in Hausa was recently made in Alidou's (1995) account of reduplication and truncation, and Rosenthall's (1999) analysis of nominal plurality.

The following study earns much to the descriptions mentioned above when arguing that, by employing weight, iambic foot structure has been well established in Hausa, aspiring to serve as a significant subsystem shaping its morphology.

At the same time, it is worth stressing that no overt interaction between tone and iambic foot can be observed in the language described: neither the head of a foot attracts H tone to mark prominence (4a), nor is the foot a tone bearing unit in longer words (4b; unlike in Kera described above).

(4)
    a. foot-head not marked by H
    (HL)   (**ʔí.dòò**)   'eye' vs. (LH) (**ɗi.yáá**) 'daughter'
    b. foot not associated with one tone
    (LH)(L) (**mà.ráá**)(**yàà**) 'orphan'
    (HL)(H) (**gú.dàà**)(**wáá**) 'diarrhea'
    cf.
    (LL)(H) (**ʔà.bòò**)(**kái**) 'friends'
    (H)(HH) (**hán**)(**zá.ríí**) 'haste'

As such, the relation between metrical structure and tone lies outside the scope of our study. Instead, we concentrate on the emergence of iambicity in various morphological categories in Hausa. The role of iambic foot is illustrated in the following chapter which deals with nominals: concentrating primarily on the historical development of the plural formation, we claim that the original role of tone in defining the mentioned category has been supplanted by iambic template. Subsequently, examining the function of iambicity in verbs, we highlight the problem of opacity it faces when confronted with the variation in weight of ultimate syllable. Specifically, while iambic template will be argued to have been established both in the category of denominal verbs (so-called "verbalizer, §3.2) and verb pluractionals (§3.3), in chapter 3.4 we provide a diachronic account

of the opacity, based on a revised version of Parson's "grade system" (Newman 1973). The study concludes that whereas grade-driven variation in weight bleeds iambic structure, the latter still significantly determines the shape of the analyzed formations and thus proves to be a useful tool in explaining morphology throughout the language.

1.4 Methodology

Acquiring the basic tenets of Prosodic Morphology described in 1.2 above, the following study views the facts through the interpretative language of Optimality Theory (henceforth OT, cf. Prince & Smolensky 1993/2004, McCarthy & Prince 1993a, 1994) which postulates that any given surface form is the result of an interaction between universal constraints that are violable and ranked on a language-particular basis. However, we deviate from the standard OT in its approach to requirements on prosodic size. In particular, the Theory prevents such requirements from being accessed directly, making them arise only from the combination of some other constraints (e.g. the disyllabic or bimoraic structure of Minimal Word derives from the requirement that a linguistic unit is defined by Prosodic Word which in turn contains a foot (due to the co-called Prosodic Hierarchy), abetted by FOOT-BIN which constrains feet to be binary under syllabic or moraic terms). On the other hand, following frequency-based analyses by Zipf (1935) and Mańczak (1965, 1969), Kraska-Szlenk (2009) argues that size requirements should be addressed directly as prosodic constraints – pointing to solid functional grounding of such constraints, the author states that "[…] frequent, hence more predictable, linguistic units need fewer cues for their recognition and can afford reduction while minimizing articulatory effort [whereas] augmentation of lexical words to a more conspicuous size makes them more salient in the discourse, which complies with their greater functional value" [Kraska-Szlenk 2009:274].

Both augmentation and reduction phenomena discussed in the study seem to bear out the claim quoted: three salient morphological categories in Hausa – nominal plurals, verb pluractionals, and the so-called verbalizer – will be shown to augment in weight utilizing a

template defined by iambic structure. Closely examining the above categories, we will furthermore demonstrate how constraints on augmentation in lexical words interact with frequency-driven reduction in affixes.

2. Iambic foot in nominal morphology

2.1 Background – canonical word structure in nominals[3]

While recent loanwords have increased the number of mono- and polysyllabic nominals, monomorphemic words in Hausa typically comprise two syllables. Moreover, most native common nouns and adjectives end in a long vowel, e.g. **rúúwáá** 'water', **gàríí** 'city', **ɗányéé** 'raw, unripe', **s'ágèèráá** 'bad-tempered'. As such, the length of a final vowel plays a functional role in that its shortening produces denominal adverbs (cf. **dáréé** 'night' vs. **dáré** 'at night'), and may distinguish common nominals from proper names, e.g. **gájééréé** 'short' vs. **Gájééré** 'Short man', and verbs from deverbal nouns: **gírmá** 'to grow up' vs. **gírmáá** 'bigness', 'prestige'.

Concentrating on the metrical structure, most nominal words can be neatly parsed by iambic foot: (**kú.ɗíí**) 'money' (**háá**)(**tì.míí**) 'seal', (**bóó**)(**kòò**) 'fraud' – in fact, as observed by Pearce (2007:70), only 1% of nouns quoted in Newman (2000) contains a sequence of two or more light syllables, which is generally avoided in iambic systems. Most of these are loans, cf. **ʔà.yà.bà** 'banana' (<Yoruba), **há.rà.fíí** 'letter' (<Arabic). However, neither lengthening nor deletion is attested to avoid potential ill-formed items in simple nominals, which leaves us only with static generalizations. On the other hand, most of the unparsable words undergo repair strategy when forming a plural, cf. gemination in pl. (**há.rúf**)(**fàà**). Indeed, rich inventory of plural classes, and extensive data provided by Hellwig

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[3] Since non-derived adjectives are morphologically indistinguishable from nouns, for the purpose of our discussion we analyze them together with the latter under the common name, "nominals" (cf. Parsons (1963) who calls adjectives "dependent nominals"). Consequently, while throughout the work we make reference to **noun** morphology, it should be understood that adjectives participate in word-formation processes on the same conditions.

& McIntyre (2000), Newman (1973,2000) *et al*, enable us to trace the emergence of iambicity from diachronic perspective, as well as to thoroughly examine its synchronic role in the category.

2.2 Emergence of iambic template in Hausa plurals

2.2.1 Introduction

There is a number of ways of forming a plural in Hausa. Newman (2000) mentions fifteen major plural classes, which are further divided into more than forty surface forms. Moreover, each singular noun can have more than one plural pattern:

(5)

Singular		Plural
túdùù	'hill'	**tûddáá = tùddái = túddúnàà**
ɓééráá	'rat'	**ɓééràày̋éé = ɓééràrrákíí**

Parsons (1975) observes that certain plural types are loosing their productivity in favor of the others, the most common nowadays being **-oo.ii**. A thorough study of this process is provided by Hellwig & McIntyre (2000): having established the relationship among Hausa plurals, they account for the multiplicity of the patterns by tracing their historical development. Through this diachronic perspective, the authors are able to distinguish the gradually-introduced typological principles of Hausa plural formations.

These include:
- change in tone pattern and vowel sequence
- addition of a third consonant not found in the singular form
- reduplication
- suffixation

The first principle above governed already the archaic plurals, and is found throughout all the formations. All the other three are newer developments.

Acquiring most of Hellwig & McIntyre's remarkable insights, we focus in this chapter on a single factor which, in our view, triggered the establishment of these three principles, i.e. on the emer-

gence of iambically defined size requirement in Hausa plurals. Before so doing, however, it is practical to bring forward the said authors' observations that are most significant for our discussion.

2.2.2 The three systems

Hellwig & McIntyre propose that "classes of approximately the same age make use of the similar formatives [while] classes whose ages differ use different formatives or have reinterpreted an older formative as part of the suffix" (Hellwig & McIntyre 2000:8).

Plurals using similar formatives are grouped into three separate systems. The most archaic formations are included in the "semantic system", as the nouns found here share the basic vocabulary, such as body parts, animals, and domestic items. As for the phonological clues, each particular plural pattern is assigned to the singular according to its tone shape (HL sg > **-aa**/**-uu** pl.; LH sg > **-ii** pl). The authors note also that the vowel quality of plural suffixes is partially predictable, according to Pilszczikowa-Chodak's (1972) "final vowel contrast": plurals ending in **-uu** are formed on the basis of **-ii/-aa** singulars, whereas those with **-ii** suffix are chosen by **-aa** or **-uu** (from which surface **-oo** is derived (Newman 1990a)).

Regarding the means of formation, a change in tone pattern and vowel sequence of the plurals are the only defining principles in this system, other phonological characteristics being disregarded:

(6) a. Singular: HL   Plural: H, **-aa/-uu**

           gíʝìì 'house'   **gídáá**

           míʝìì 'husband'   **mázáá**

           gáá.ʃìì 'hair'   **gáásúú**

    b. Singular: LH   Plural: LH, **-ii**

           fààráá 'locust'   **fààríí**

           sʼààkóó 'chicken'   **sʼààkíí**

On the other hand, in the second system, termed "prosodic", it is only the phonological characteristics of the singular noun that serve as the defining criterion. Tone pattern still plays a role here:

-aa.aa plurals, for example, correlate generally with singulars having HL tones, while HH singulars take **-aa.ee**. There are also signs of vowel and consonant quality shaping the plural surface forms. However, as furthermore argued by the authors, the number of radicals has a special significance: "in the case of tri-radical singular nouns [only] tone pattern and vowel sequence are changed. Di-radical singulars are augmented in various systematic ways". (Hellwig & McIntyre 2000:14). These include reduplication, gemination, or addition of the third consonant (either epenthetic or copied from the root):

> (7)
> "Three radicals" constraint

a. *addition of a consonant*

	Singular		Plural
	gídáá	'house'	**gídààɟéé (< gídààdéé)**
	kíífíí	'fish'	**kíífààyéé**
cf.	**gárkéé**	'flock'	**gárààkéé**

b. *gemination*

	Singular		Plural
	rábóó	'portion'	**ràbbái**
cf.	**máálàmíí**	'teacher'	**mà\u00e0làmái**

b. *reduplication*

	Singular		Plural
	gàríí	'city'	**gárúúrúkàà**
cf.	**gààtáríí**	'axe'	**gáátúràà**

The authors conclude, after Wolff (1993), that the three-radical requirement derives from the fact that the change in vowel sequence of the plurals never affects the first vowel, being rather applied to the penultimate and the final syllable. The requirement was not present in the former system, in which the plural suffix comprised only one syllable (**-ii; -aa; -uu**). The prosodic system, on the other hand, came along with the introduction of the long internal

vowel[4] that augmented plural endings (as in **-aa.ee**). Thus, the third consonant was required to resolve a hiatus (sg. **gídáá** > pl. **gí.dàà.jéé**, but not ***gí.dàà.éé**). However, at least the examples with gemination show that the alleged "three radicals" constraint applies even if only the final vowel is subject to change, and there is no need to brake the hiatus:

(8)

Singular		Plural	
rábóó	'portion'	**ràbbái**	***ràbái**
túdùù	'hill'	**tùddái**	***tùdái**
dámìì	'bundle'	**dàmmái**	***dàmái**
s'íròò	'sprout', 'shoot'	**s'irrái**	***s'ìrái**

Also, when there already are as many as three radicals in the singular, gemination still occurs:

(9)

Singular		Plural
dáràsíí	'lesson'	**dárússàà**
háràfíí	letter of alphabet	**háruffàà**
šáràɗíí	'agreement'	**šárúɗɗàà**

To account for these examples, Hellwig & McIntyre (2000:19) quote Newman's (1972) remark that gemination, reduplication and consonant-repetition (as opposed to epenthesis) coincide with the occurrence of a singular with a light first syllable:

(10)

	Singular	Plural
a. *Consonant-repetition vs. epenthesis*		
	<u>má</u>záá 'husband'	**mázààjéé** (<**mázààzéé**)
cf.	<u>máá</u>táá 'woman'	**máátààyéé**

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[4] The authors call this vowel the "Internal A", referring to a wider phenomenon of plural formation attested in Afroasiatic languages.

b. *Gemination*

	rábòò	'portion'	**ràbbái**
cf.	**ǰáákìì**	'donkey'	**ǰààkái**

c. *Reduplication*

	číkíí	'belly'	**číkúnkúnàà**
cf.	**ǰáákìì**	'donkey'	**ǰáákúnàà**

Returning to the diachronic perspective, the authors point to a plural pattern similar to the one listed in (8) and (10b) (e.g. **ràbbái**): it applies to singulars of the same shape (disyllabic, light first syllable, HL tones) and uses the same suffix, yet displays a different tone pattern: HH. What also varies, is the lack of gemination:

(11)

Singular	Plural	
bírìì	**bírái**	'monkey'
wús'íyàà (< †**wús'í**)	**wús'ái**	'tail'
zúmùù	**zúmái**	'close friend, relation'
čínyàà (< †**číní**)	**čínái**	'thigh'

This plural formation is claimed to be archaic and restricted to a small number of basic disyllabic nouns containing a light initial syllable. Moreover, as observed by Newman (2000), contemporary Hausa speakers tend to use other, more productive forms for these singulars (e.g. **čínyàà / čín.yóó.yíí** thigh)**.** Newman adds that this pattern can be related to the **-ai** form which in the same context would make use of gemination, "but they may very well have distinct origin" (Newman 2000:455). Hellwig & McIntyre (2000) lean towards establishing a relationship between the two classes. They explain the difference in tonal shape of these plurals by quoting the observation made by Newman (1997), that some nouns show the correlation between weight of the first syllable and tone pattern:

(12)

S¹: heavy		S¹: light	
a. **Hàu.sàà.wáá** 'Hausa people'		**Ká.náá.wáá** 'Kano people'	
b. **Làà.díí.dí** (<**Láádì**) 'little Ladi'		**ʔí.núú.nú** (<**ʔínúú**)	
			'little Inu'
ʔáu.dúú.dú (<**ʔáudù**) 'little Audu'		**Kú.lùù.lú** (<**Kúlù**)	
			'little Kulu'

Plurals of disyllabic ethnonyms (12a.) with a heavy first syllable tend to have an L-L-H tone pattern, while those with a light initial syllable invariably have all H tones. Hypocoristic names formed by reduplication of the last syllable (12b.) have L-H-H tone pattern if the first syllable is heavy. If it is light, the word has an initial H tone, others being unpredictable. Given this, Hellwig & McIntyre argue that gemination, typical of class 2 nouns like **tùddái** 'hill', preceded the change in tone pattern from HH to LH:

(13)

††**tú.dái** → †**túd.dái** → **tùd.dái**

We will not engage in the discussion on tone-weight correspondence here, as it is outside the scope of the study. Suffices to say that as far as proposed by Hellwig & McIntyre, plurals in (11) are related to those in (8), yet they are free of any syllable-weight requirements that could trigger gemination. On the other hand, patterns in (8) reveal weight-sensitivity in such a way that the occurrence of light initial syllable in the singular coincides with the gemination in the plural.

Interestingly however, the authors do not include the archaic **-ai** formation in the semantic system, even though it seems to be shaped by similar principles (a change in tone pattern/vowel sequence, no gemination, only basic words affected). Instead, they claim that its surface form is derived. This is supported by Newman's (2000:434) remark, that the shape of **-ai** diphthong is exceptional with respect to other plural suffixes. Hellwig & McIntyre pro-

pose that **-ai** is reduced from **-aayii** < **-aakii** with a remnant of an old determiner[5], as illustrated by the following example:

(14)

Singular	Attested Plurals
kíbíyàà (<†**kíbì**)	**kíbáu; kíbááwúú** [6] 'arrow'
	kíbái (<†**kíbááyíí** <†**kíbáákíí**)

This suggests that **-ai** plural type developed in an irregular way, contrary to the general tendencies in the prosodic system, where most plurals were subject to augmentation rather than reduction. As for other irregularities found in the system, the authors observe that while the processes of reduplication and gemination were originally designed to apply to the plural forms whose singular counterparts contained a light first syllable, the pattern was later expanded regardless of the syllable weight. Therefore, we have, albeit few, instances of reduplication such as the following:

(15)

Singular		Plural (simple)	Plural (reduplicated)
Bààkíí	'mouth'	**báákúnàà**	**báákúnkúnàà**
líttááfíí	'book'	**líttààfái**	**líttàttàfái**
rààfíí	'stream'	**rááfúkàà**	**rááfúffúkàà**

Finally, plurals belonging to the last, "suffix system", developed on the basis of patterns found in former systems, and are defined as the ones which disregard the tone pattern, syllable weight, and the number of radicals in the singular. Instead, what determines the choice of plural class is the vowel sequence alone.

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[5] Following Wolff (1993), the authors claim that determiners were once present in Hausa singular nouns, occupying the word-final position. Weakened at a later stage, they survived in plurals as onsets of the final vowels.
[6] Unconditioned switch from **/u/** to /**i**/ and *vice versa* is highly common in Hausa.

Table 2. Vowel sequence and system 3 plurals (Helwig & McIntyre 2000:34)

Singular	Example	Plural form	Tone patterns of the sg
V* - ii/-uu	**máálàmíí**	**mààlàmái**	LLL, LLH(L), LHL(H), LHH(H), HHH, HHL, HLH
V* -aa	**dàbááràà**	**dàbààrúú**	LLH, LHL(H), LHH, HHH, HHL, HLH
aa* - ii/-uu	**ʔàgóógóó**	**ʔágóógúnàà**	LLH, LHH
V*-aa	**díláá**	**dílóólíí**	LLH(L), LHL(H), LHH, HHH, HHL(H), HLH(L), HLL

The system described consists of three classes:
a. **-oo.ii**
b. **-ai (-ii/-uu)**
c. **-u.naa**

-oo.ii, being the most productive of all plurals in Hausa, is formed by adding two heavy vowels separated by the radical copied from the singular root (plus imposing H tone pattern on the noun): **báràà > báróóríí** 'servant'. The **-oo.ii** pattern is directly linked to its counterpart found in the prosodic system:

(16)

Singular	Plural (prosodic system)	Plural (suffix system)
zúúčìyáá ([†]**zúktì**) 'heart'	**zúkóóčíí** < /**zúkóótíí**/	**zúúčíyóóyíí**

As shown in (16), the plural **zúkóóčíí** can be regarded older, as it is based on the nowadays absent, non-inflected feminine singular[7], with **-oo.ii** being separated by the last radical of its root. In the pattern that belongs to the suffix system, the historical singular form is ignored in favor of its feminine form whose suffix (-**iyaa**) is treated as part of the root.

Moreover, the consonant-repetition introduced in the prosodic system and applied only in the phonologically restricted environment (di-radical singulars with a light first syllable), has developed here into a morphological plural formative. It is illustrated in the following example, where a copied radical is underlined (obstruents palatalize before affixes with initial -ee/-ii):

(17)

Prosodic system		Suffix system	
Singular	Plural	Singular	Plural
root: CV.C			
-**gídáá** 'house'	**gíd̠àà̠ɟéé** < /**gíd̠ààd̠éé**/	**táš̠àà** 'station'	**tás̠óóš̠íí**
root: CVV.C			
- **kíífíí** 'fish'	**kíífààyéé** (***kííf̠àà̠féé**)	**fààráá** 'locust'	**fáár̠óór̠íí**

The second class presented here is formed by suffixing **-u.naa** along with the HL tone shape. It is linked to the **-u.aa** pattern found in the prosodic system, yet considered to be a newer development due to the fact that – unlike the "prosodic" affix – it constantly preserves /**n**/ as the hiatus-braker:

(18)

Prosodic system		Suffix system	
Singular	Plural	Singular	Plural
kòògíí 'river'	**kóógúnàà**	**bénčìì** 'bench'	**bénčúnàà**
ɟààkíí 'donkey'	**ɟáákúnàà**	**góóráá** 'gourd'	**góórúnàà**

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[7] Hellwig & McIntyre treat such forms as masculine. Newman (2000:213) argues they were rather feminine, and received an overt gender-marking suffix at a later stage.

cf.   **ràɑ̀fíí** 'stream' **ráɑ́fúkàɑ̀**   **tùùlúú**   **túúlúnàɑ̀**

                                          'water pot'

    wííl`ì 'wheel' **wíílúkàɑ̀**   **gàrmáá** 'hoe' **gármúnàɑ̀**

The choice of the consonant added to separate the **-u.aa** hiatus was, according to Hellwig & McIntyre, formerly dictated by the nature of the final radical of the base: by way of dissimilation, nouns with the plosives took /**n**/, while other forms - /**k**/[8]. Plurals from the suffix system ignore this correlation, which implies that at some point in time, /**n**/ developed into an integral part of the morphological plural formative: **-u.naa**.

Further evidence that **-u.naa** functions as a separate plural pattern is drawn from the fact that the suffix is attached even to the forms that already contain three radicals in their base:

(19)

Prosodic system		Suffix system		
Singular		Plural	Singular	Plural
ɉàɑ̀kíí	'donkey'	**ɉáɑ́kúnàɑ̀**	**lárdìì** 'province'	**lárdúnàɑ̀**
cf. **hárʃèè**	'tongue'	**hárússàɑ̀**	**hárʃèè**	**hársúnàɑ̀**
čóókàlíí	'spoon'	**čóókúlàɑ̀**		

In the prosodic system, the pattern surfaces as -**u.naa** only if there are no more than two radicals in the singular – otherwise, it is the last consonant of the root that breaks the -**u.aa** hiatus. This condition is ignored in the parallel plural type found in the suffix system, suggesting that /**n**/ has become an integral part of the -**u.naa** suffix.

The last class considered to belong to the suffix system adds -**ai** or -**ii**/-**uu** plus the LH tone pattern. The suffixes are considered to be young, as they pluralize a number of loanwords (with -ai suffix

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[8] As noted by the authors, final /**w**/ also triggered the insertion of /**n**/. This ambiguous patterning is explained by Newman (1972), who states that in several contexts, /**w**/ surfaces as a weakened form of /**k**/. Historically, as argued by Wolff (1993), the two radicals originate in gender-marking determiners – cf. footnote 4.

taking many Arabic loans of three or more syllables), and repluralize the forms found in the second system:

(20)

Singular	Plural (prosodic system)	Plural (suffix system)
gúzúmáá 'cow'	**gùzààmèè**	**gùzààmái**
gúmkìì 'fetish'	**gúmààkáá**	**gùmààkái**

What will be significant in our discussion further below, all the plurals belonging to the suffix system are argued by the authors to be weight-insensitive (in Newman's (1972) terms, i.e. the weight of the initial syllable does not trigger any further augmentation). This is summarized in table 3.

To conclude, Hellwig & McIntyre (2000) claim that Hausa plural formations revealed weight-sensitivity in the prosodic system by introducing new principles of augmentation. In particular, a specific syllable structure of the singular correlated with gemination, reduplication or consonant-repetition in the plural. This correlation is argued to be lost in the suffix system, in which plurals are formed by referring exclusively to the quality of a final vowel of their singular counterparts. The principles shaping each plural system are listed below in the table 4.

Slightly revising Hellwig & McIntyre's (2000) proposals, in the following section we shall argue that the constraint on weight-augmentation did not vanish in the plural system described; on the contrary, the new plurals may surface in the forms present above only if it is fulfilled. Specifically, it will be claimed that since the introduction of the prosodic system Hausa plurals have had to satisfy an iambic template, described in detail below.

2.2.3 The prosodic constraint

The role of a prosodically-defined template in shaping various morphological categories of a language, already mentioned in the introduction, has been widely acknowledged in the literature (treatments of particular languages include Arabic (McCarthy & Prince 1990), Penutian languages (Goldsmith 1990, Archangeli 1983); also for templatic-truncation phenomena see Weeda 1992). This section argues that a templatic requirement has been imposed on Hausa plural system in the course of its development, triggering the introduction of new, augmentation processes aimed at fulfilling the template. Below we specify the shape of this size constraint with reference to Hellwig & McIntyre's remarks discussed in the previous section. Out of the principles of plural formation detailed by the authors, we focus first on the role of gemination and partial reduplication as weight-augmenting processes. Consonant-repetition (as in **da.maa.mee**), while also considered to be an instance of template-driven augmentation, does not add weight by itself and as such will be discussed separately further below.

2.2.4 The argument

It has been noted that Hellwig & McIntyre (2000) accept Newman's (1972) claim that it is the first light syllable of the singular that triggers reduplication/gemination, and, accordingly, the authors treat those plurals which do not apply RED/G in the said context as weight-insensitive:

(21)

	Singular		Plural
a. weight-sensitive	**dámìì**	'bundle'	**dàmmái**
	ǰíkìì	'body'	**ǰíkúnkúnàà**
b. weight-insensitive	**ʔàkààwúú**	'clerk'	**ʔákááwúnàà**
	màkááníkèè	'mechanic'	**màkàànìkái**
	díláá	'jackal'	**dílóólíí**

What Newman (1972) proposes in particular is that weight-augmentation in the plurals is applied to CV.C- roots to ensure that one has a minimum of two moras in the base to which the suffix is added.

(22)
   „Two-moras" requirement

dá.m-   'bundle'   **dàm.mái**

  μ   μ μ

However, this rule was originally designed to account for weight-addition in **-ai** pattern, as in (21a), and therefore it does not explain some of the other instances of weight-augmentation. Consider the following:

(23)

Singular		Plural
háɗàríí	'accident'	**háɗárúrrúkàà**
kábàríí	'grave'	**kábárúrrúkàà**
šá'àníí	'affair'	**šá'ánúnnúkàà**

As seen in (24), the singular root contains two light syllables, i.e. two moras. Nevertheless, the plural is formed by suffixing **-u.kaa** along with the reduplication:

(24)
há.ɗà.ríí → **há.ɗá.rúr.rú.kàà (*há.ɗá.rú.kàà)**

  μ μ

Geminated forms already mentioned in (9) behave in a similar manner:

(25)
há.ɾá.fíí → **há.ɾúf.fàà (*há.ɾú.fàà)**

  μ μ

Nouns such as above augment in weight and shun the forms that would be expected according to bimoraic requirement. On the other hand, singular roots do not geminate/reduplicate to achieve bimoraicity when pluralized by the following forms, all of which contain two heavy syllables:

(26)

	Singular	Plural		
a. **-aa.ee**	**gí.dáá**	**gíd.àà.ǰéé**	cf. **gí.dáá.dú.wàà**	'house'
b. **-aa.uu**	**gá.ɓàà**	**gáɓààɓúú**	cf. **gáɓ.ɓú.nàà, gàɓ.ɓái**	
				'syllable'
c. **-aa.aa**	**hár.šèè**	**há.ràà.sáá**	cf. **há.rús.sàà**	'tongue'
d. **-oo.ii**	**sá.màà**	**sá.móó.míí**	cf. **sàm.mái**	'sky'

To sum up, "two moras" constraint appears not to survive close scrutiny as a general rule, by not predicting that bimoraic roots use reduplication/gemination as in (23, 25), and that monomoraic roots in (26) strain from it.

Reconsidering the observations made so far, we can state that, when dealing with the root containing no heavy syllables, the plural receives internal weight augmentation only when it is formed by adding:

a. a heavy (-VV) syllable rhyme, eg. -ai
b. combination of a light and heavy rhyme (-V.VV), e.g. -u.aa

In light of the subject of our study, we could paraphrase the generalizations above, stating that reduplication/gemination correlates with those patterns that suffix one iambic foot: ($\sigma_{\mu\mu}$), or (σ_μ $\sigma_{\mu\mu}$):

(27)

	Singular	Plural
a. ($\sigma_{\mu\mu}$)-> G	**túdúú**	**tùd<u>dái</u>**
b. (σ_μ $\sigma_{\mu\mu}$)-> G/RED	**číkíí**	**čík<u>kúnàà</u>**
	bákàà	**bákún<u>kúnàà</u>**

When the singular root contains at least one heavy syllable, no reduplication/gemination occurs:

(28) **ʄààkíí** **ʄààkái = ʄáákúnàà**

Moreover, formations that add two heavy syllables – or rather, two iambs – to the root, are not further augmented in weight:
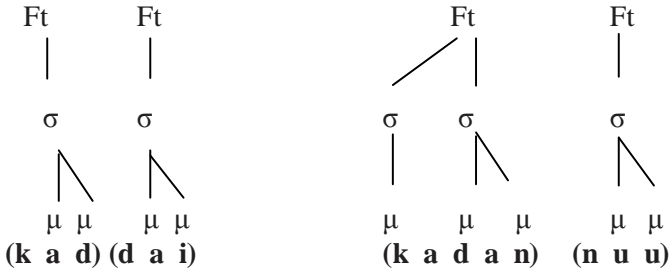
(29)

	Singular	Plural
a. **-oo.ii**	**báràà**	**bár<u>óórí</u>í**
b. **-aa.ee**	**gídáá**	**gíd<u>ààʄ</u>éé**
c. **-aa.uu**	**gáɓàà**	**gáɓ<u>ààɓ</u>úú**
d. **-aa.aa**	**háršèè**	**hár<u>ààs</u>áá**

Interestingly, what the surface forms of the plurals in (27 – 29) have in common is that they consist of two iambic feet:

(30)

a. **-ai**	**(tùd)(dái)**
	(ʄàà)(kái)
b. **-u.aa**	**(bá.kún)(kú.nàà)**
	(ʄáá)(kúnàà)
c. **-oo.ii**	**(bá.róó)(ríí)**
d. **-aa.ee**	**(gí.dàà)(ʄéé)**

The same characteristic can be furthermore observed in other productive plural formations as well. Wolff (1993:143) lists several distinct plurals designed for a singular noun **kádòò** 'crocodile', all of which belong to the post-semantic system. Despite the diversity, all the forms fall under the same scheme mentioned above, as they comprise two iambs: **(kàd)(dái), (kà.dùn)(níí), (kà.dàn)(níí), (kà.dàn)(núú), (kád)(dú.nàà), (ká.dán)(dú.nàà), (ká.dàn)(dá.níí), (ká.dáá)(dú.nàà), (ká.dáá)(dú.wàà), (ká.dóó)(díí).**

(31)

```
    Ft        Ft                        Ft              Ft
    |         |                        /  |             |
    σ         σ                      σ    σ            σ
    /\        /\                     |    /\           /\
   μ  μ      μ  μ                    μ   μ  μ         μ  μ
 (k a d)  (d a i)                  (k a d a n)      (n u u)
```

Indeed, the crucial claim we make below is that a number of productive Hausa plural classes are formed on the condition to have more than one iambic foot. The patterns that attach only one iamb to the root consisting of no heavy syllables, as in (32a) below, need to fulfill this condition by augmenting the base with the use of reduplication or gemination. On the other hand, the absence of these processes in the plurals found in (32b) is due to the fact that, already having two iambs as part of their formatives, they simply do not need to further augment the base.

(32)

a. -($\sigma_{\mu\mu}$), -(σ_μ $\sigma_{\mu\mu}$): RED/G

dámìì	'bundle'	**(dàm)(mái)**	*(dàmái)
s'íròò	'sprout', 'shoot'	**(s'ìr)(rái)**	*(s'ìrái)
gàríí	'city'	**(gá.rúú)(rú.kàà)**	*gá(rú.káá)
ǰíkíí	'body'	**(ǰí.kún)(kú.nàà)**	*ǰí(kú.nàà)

b. -($\sigma_{\mu\mu}$)-($\sigma_{\mu\mu}$): no further augmentation required

báràà	'servant'	**(bá.róó)(ríí)**
bìkáá	'baboon'	**(bí.kàà)(kéé)**

This prosodic requirement is captured formally by two constraints:

(33)

PRWD=2IAMBS
"Prosodic Word comprises two iambic feet"
CONTAIN-PRWD
"lexical word contains Prosodic Word"

For the purpose of the discussion, we will use the constraint CONTAIN-2 IAMBS, "Lexical word contains two iambic feet", which encapsulates the two above.

Since neither reduplication nor gemination shaped archaic plurals, we could assume that such patterns are free of the prosodic requirement in (33). Indeed, among the oldest plural formations we find several that contain only one iambic foot.

(34)

Singular	Plural	
mî̃jìì	**má.záá**	'husband'/ 'men', 'males'
gî̃jìì	**gí.dáá**	'house'

Significantly, at some point in time nearly all such forms simply ceased to function or have been reinterpreted as singulars and acquired another plural. In the following examples the CV.CVV plurals found in Western Hausa (i.e. in the more conservative dialect) have been redefined as singulars in the more progressive, standard variety. The "new" singulars have acquired another plural pattern, already mentioned in (7a), namely **-aa.ee** (Newman, 2000:456).

(35)

Sg: WH	Pl: WH = = Sg: Standard Hausa	Pl: SH	
dúmèè	**(dú.máá)**	**(dú.màà)(méé)**	'gourd'
gíɟìì	**(gí.dáá)**	**(gí.dàà)(ɟéé)**	'house'
kárèè	**(ká.ráá)**	**(ká.ràà)(réé)**	'cornstalk'
kúɟèè	**(kú.dáá)**	**(kú.dàà)(ɟéé)**	'fly'

On the other hand, most of the archaic plurals formed on the basis of a root consisting of a heavy syllable, while having secondary plurals in other, more productive classes, have not lost their plural reading:

(36)

		Singular		Plural	Alternative plural
a. -uu	**gáášìì**	'hair'		**gáásúú**	**gáásóóšíí**
b. -ii	**kʷààɗóó**	'frog'		**kʷááɗíí**	**kʷááɗúnàà**

This can be explained by the fact that the forms in (36), unlike those in (34), meet the "two iambs" constraint: **(gáá)(súú)** 'hair', **(kʷáá)(ɗíí)** 'frog', cf. **(ká.ráá)** 'cornstalk'.

Note also that none of the foregoing archaic patterns is formed by affixing two heavy syllables. Hellwig & McIntyre (2000:11) observe that while in the semantic system only the final vowel is changed, plurals in the prosodic system are formed by additional inserting of a long vowel to the non-initial penult.

(37)

semantic system	prosodic system	
Singular	Plural	Plural
gíɟìì 'house'	**gíd<u>áá</u>**	**gíd<u>ààɟ</u>éé**

We have seen above that the long internal vowel emerged in Hausa along with the prosodic requirement for plurals. Therefore, it could be treated as one of the three developments introduced to fulfill the condition in (33).

We should admit however that in the course of their development, Hausa plurals were not only subject to augmentation, as there are cases of plural patterns that have been phonologically reduced. Most evident among the latter is one of the largest plural classes, namely –**ai**. As mentioned, Newman (2000:434) treats the diphthongal nature of the suffix highly exceptional when compared to other plurals, indicating that it is likely to be historically derived from –**aa.yE** (i.e. either –**aa.yii**, or –**aa.yee**). The reduction phenomenon turns predictable if taken as an example of the invert size/frequency correlation, observed as early as Zipf (1935). Following up on this thought, Kraska-Szlenk (2009:273) argues that while reduction of frequent grammatical morphemes starts in a few of the most frequent lexical items, it is likely to spread by way of lexical diffusion. However, spreading may be "blocked by minimal size requirements […] leading to the emergence of a phonologically conditioned allomorphy rule". Formally, reductions of this type may be expressed by constraints on size maximality (Kraska-Szlenk,2009). Consequently, the constraint responsible for the shortening in **aa.yE** > **ai** would be formulated as NO-2σ-aa.yii. Among the words utilizing the reduced suffix, there is a handful of basic nouns, which violate CONTAIN-2 IAMBS, e.g.:

(38)

Singular		Plural	
bí.rìì	'monkey'	**bí.rái**	< †**bí.ráá.yE**
kí.bí.yàà (<†**kí.bìì**)	'arrow'	**kí.bái**	< †**kí.báá.yE**
wú.s'ìì	'tail'	**wú.s'ái**	< †**wú.s'áá.yE**

Now, let us recall that the reduced version of the suffix, according to Hellwig & McIntyre (2000), started to function already in the prosodic system – or, as in our proposal, at the time when the minimal size requirement had already been established in plurals.

Therefore, when spreading to other, less frequent lexical items, it could surface unchanged only in those nouns which could simultaneously fulfill CONTAIN – 2 IAMBS constraint. On the other hand, when applied to shorter roots, it was accompanied by various repair strategies aimed at fulfilling the requirement on size – these include reduplication and gemination (presumably, at some point in time, the size constraint was so well established in the system that it affected the most frequent nouns as well. These however, retained the "short" version as an alternative):

(39)

	Singular		Plural	
a. no change	**bùn.sú.rúú**	'he-goat'	**(bùn)(sù.rái)**	
	ɗáá.lì.bíí	'student'	**(ɗàà)(lì.bái)**	
b. G	**tú.dùù**	'hill'	**(tùd)(dái)**	*(tú.dái)
	kʷá.bòò	'penny'	**(kʷàb)(bái)**	*(kʷá.bái)
c. RED	**bí.sáá**	'packedanimal'	**(bì.sài)(sái)**	*(bí.sái)
	wús'ìì	'tail'	**(wù.s'ài)(s'ái)** or	
			(wú.s'ái)	

Still, Newman (2000:434) observes that it is polysyllabic words that normally go with **-ai** plural type. On the other hand, most disyllabic words with a light initial syllable are pluralized by **-aa.ee**. Significantly, since there are no other plurals in Hausa that end in /**ee**/ (and no plurals at all that end in /**oo**/), Newman claims that **-aa.ee** "is historically secondary, most likely resulting from monophtongization of /-**ai**/" (diphthongs commonly simplify in Hausa, cf. **dìréébàà** /**dìráibàà**/ 'driver', **náiràà** = **nééràà** (Nigerian currency)):

(40)

Singular		Plural	
ƙá.sáá	'country/province'	**(ƙá.sàà)(šéé)**	[†]**(ƙá.sàà)(sái)**
dá.móó	'land monitor'	**(dá.màà)(méé)**	[†]**(dá.màà)(mái)**

51

As such, **-aa.ee** class serves as the main allomorph of **–ai**, introduced to fulfill the "two iambs" condition when dealing with shorter singular roots.

What is more, since words that employ **-aa.ee** pattern consist of two light syllables with a H-tone pattern, it follows that most of the erstwhile plurals which violated the CONTAIN-2 IAMBS constraint have been repluralized by this class, themselves being reformulated as singulars. Needless to say, all of them end in -**aa**, as already seen in (35) above. We consider this archaic plural suffix to be the plausible origin of the co-called "internal A" in Hausa plurals[9]. To sum up this part, below we provide the historical development of -**ai** to –**aa.ee**:

Table 5.

STEP 1 – SEMANTIC SYSTEM	
Singular	Plural 1
bí.rìì 'monkey'	†**bí.ráá**

STEP 2 – EMERGENCE OF 'CONTAIN-2 IAMBS'		
	Plural 1	Plural 2
	†**bí.ráá** →	†**bí.ráá.yíí**

STEP 3 – SPORADIC, FREQ-DRIVEN REDUCTION ('NO-2σ-aa.yii')	
Plural 2	Plural 3
†**bí.ráá.yíí** →	**bí.rái**

STEP 4 – LEXICAL DIFFUSION (BLOCKED BY MINIMAL SIZE REQ)			
	Singular	Plural 1/3	Plural 4
	bùn.sú.rúú 'he-goat'	**(bùn)(sù.rái)**	
cf.	**dúmèè** 'gourd'	*(**dú.máá**)	**(dú.màà)(méé)**
	kúɟèè 'fly'	*(**kú.dáá**)	**(kú.dàà)(ɟéé)**

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[9]Under this approach, the original singular form of **ká.sáá** 'country/province' would be †**ká.šE** (i.e. †**ká.šíí** or †**ka.šéé**). cf. **gíɟìì** 'house', pl. **gídáá / gídààɟéé**

Now that we established the source of weight-sensitivity in Hausa plural formations, and explained the irregular development of the -**ai** plurals, let us verify whether the patterns found in the "suffix system" are insensitive to weight, as proposed by Hellwig & McIntyre. As mentioned in the previous section, three classes are claimed to belong to this system:

a. **-u.naa**
b. **-ai (-ii/-uu)**
c. **-oo.ii**

Since both, **-u.naa** and **-ai** contain only one iambic foot, they should, according to our assumptions, obligatorily trigger weight-augmentation when attached to the root that lacks iambs. Thus, the most appropriate way of testing their alleged immunity towards the prosodic constraint would be to see how these suffixes deal with the singular roots of CV.C- or CV.CV.C- shape. Recall however, that the authors' hypothesis on the weight-insensitivity of these forms rests on different claims than ours. Specifically, in their view it is only the initial syllable's weight in the singular that can reveal whether the plural form is sensitive to weight. Therefore significantly for our discussion, when verifying the character of the examined forms, Hellwig & McIntyre give only those examples of singular stems that, while having a light initial syllable, do also contain an iamb:

(41)

syllable shape	Singular	Stem	Plural
CV-initial	ʔà.kàà.wúú 'clerk' ká.lán.gúú 'hourglass drum' ʔà.góó.góo 'watch'	(ʔà.kàà)w (ká.lán)g (ʔà.góó)g	(ʔá.káá)(wú.nàà) (ká.lán)(gú.nàà) (ʔá.góó)(gú.nàà)

wá.kìì.líí 'representative'	(wá.kìì)l	(wà.kìì)(lái)
mà.káá.ní.kèè'mechanic'	(mà.káá)ní.k	(mà.kàà)(nì.kái)
ʔà.kʷàà.tìi 'box'	(ʔà.kʷàà)t	(ʔà.kʷàà)(tái)

As seen above, the reason for which the forms do not augment in weight is that they already fulfill the prosodic constraint (CON-TAIN-2 IAMBS).

Examining the relationship between these two classes and their older counterparts, Hellwig & McIntyre note that it is best described as a continuum. However, we find no forms (apart from those introduced in the semantic system) that do not meet the condition to have at least two iambs. If necessary, all of them augment in weight. Thus, for the lack of evidence to the contrary, we assume that the two formations here are no different than their forerunners with respect to their sensitivity to the prosodic requirement[10].

Consequently, the only formation from the "suffix system" that receives no internal augmentation when confronted with CV.C-roots, is the one which already contains two iambic feet – and, as admitted by the authors, is actually not a suffix – namely **-oo.ii**. Behaving in this manner, it seems to be no different than other endings that contain two heavy syllables, as for example, also very productive **-aa.ee**.

(42)

	Singular	Plural	
a. **-oo.ii**	**dí.làà**	**dí.lóó.líí**	'jackal'
	gáɓáá	**gá.ɓóó.ɓíí**	'joint'
	móó.táá	**móó.tóó.číí** < /móó.tóó.tíí/	'car'

---

[10]That said, we support Hellwig & McIntyre's claim that –**u.naa** should be regarded an updated version of –**u.aa** for the reasons other than prosodic, as illustrated by examples (18,19) above.

b. **-aa.ee**	**dá.móó**	**dá.màà.méé**	'land moni- tor'
	gí.dáá	**gí.dàà.ɟéé** < /**gí.dàà.déé**/	'house'
	súú.náá	**súú.nàà**.**yéé**	'name'

However, there is indeed a crucial difference between the **-aa.ee** and the newer **-oo.ii** pattern: while it is always the consonant copied from the stem that brakes the hiatus in the latter, such repetition occurs in the former only when the initial syllable is light – otherwise, the onset is filled by the least-marked /**y**/ (compare **dá**.**màà**.**méé** with **súú**.**nàà**.**yéé**, cf. **dí**.**lóó**.**líí** ~ **móó**.**tóó**.**číí** < /**móó**.**tóó**.**tíí**/). Both of the patterns are fully regular.

Hellwig & McIntyre note that consonant repetition generally occurred in the prosodic system in a restricted environment, while in **-oo.ii** it developed into a morphological plural formative. Applying our hypothesis to the authors' remark, we may observe that in (43a) the consonant is copied from the root if the plural stands within the domain of two iambs, i.e. within the Prosodic Word designed for Hausa plurals. If the plural exceeds the edges of PrWd [marked by square brackets], the least-marked /**y**/ occurs as the **-aa.ee** hiatus-breaker (43b):

(43)

	Singular	Plural
a.	**dá.móó**	**[(dá.màà)(méé)]**
b.	**súú.náá**	**[(súú)(nàà)](yéé)**

On the other hand, as seen in (44), **-oo.ii** copies the base-final consonant disregarding the prosodic domain.

(44)

	gá.ɓáá	**[(gá.ɓóó)(ɓíí)]**
	móó.táá	**[(móó)(tóó)](číí)** < **[(móó)(tóó)](tíí)**

To account for this observation in a formal way, we suggest that along with augmenting the weight in order to meet the condition that CONTAIN-2 IAMBS, plurals belonging to the prosodic system require that the stem be coterminous with the Prosodic Word mentioned. Now, if the size of the stem is too small, it has to extend as in (43a). The consonant duplicated from the stem therefore aligns with the syllable which, being a part of the plural affix, stands for the second iamb (underlined in **(dá.màà)**(**méé**)), i.e. is the last syllable of PrWd.

However, by filling the onset of the mentioned syllable, the consonant would mark the stem boundary within the latter (*[**(dá.màà)(m**]**éé**). This would run against the Strict Layer Hypothesis (Selkirk 1984), which requires that a lower-level unit, here the syllable, be exhaustively contained by the unit which is immediately superordinate (i.e. the foot). Now, our stem is defined by PrWd which in turn comprises two feet. The latter need to parse the lower-level constituents, i.e. the syllables, exhaustively, and therefore their boundaries must not cut across the syllable structure. Thus, to fulfill this requirement, the part of the affixal material which is aligned with the duplicated consonant, needs to be incorporated to the stem: **[(dá.màà)(méé)]**.

Both, morpheme-absorption phenomena, as well as alignment constraints on the interface between prosody and morphology are well grounded in the literature (for the former, see Łubowicz 2006; the latter are thoroughly described in McCarthy & Prince 1993a, 1993b). The constraint responsible for root-extension as in **[(dá.màà) (méé)]** is formulated as follows:

(45)
ALIGN-PRWD-R
Align(Stem, R, PrWd, R)
"Align the right edge of the stem with the right edge of the PrWd"

In **[(súú)(nàà)]**(**yéé**) the final consonant of the root (/**n**/) does not need to duplicate as it already fills the onset of the ultimate syllable of PrWd. Conversely, since the onset of /**ee**/ lies just outside

the prosodic domain, it holds no interest for ALIGN-PRWD-R. There-
fore, the **aa.ee** hiatus is resolved rather by glide-insertion, which is a
default strategy operating elsewhere in the language (Schuh 1989):

(46)

báá 'give'	+ **áyyàà**	→ **bààyáyyàà**	'mutual giving'
čí 'eat'	+ **ár**	→ **číyár**	'feed'

Note also that glide-insertion does not operate within the do-
main of PrWd, as in *[**(dá.màà)(yéé)**] since this would critically
violate ALIGN-PRWD-R, which requires that the right edge of the
stem cover the boundary of the Prosodic Word[11].

Now recall that in the newer, **-oo.ii** form, the glide is not in-
serted by default in either of the cases. Instead, root-final consonant
reduplicates disregarding the prosodic domain that consists of two
iambs:

(47)

Singular	Plural	
gá.ɓáá	[**(gá.ɓóó)(ɓíí)**]	'joint', 'limb'
móó.táá	[**(móó)(tóó)](číí)** *[**(móó)(tóó)](yíí)**	'car'
àl.màà.ɾáá	[**(ál.máá)(ɾóó)](ɾíí)** *[**(ál.máá)(ɾóó)](yíí)**	
		'fable', 'fantasy'

---

[11]An alternative approach referring to an iambic template is given in Rosen-
thall (1999), where the *base* is formed by satisfying two constraints: FOOT-
FORM=IAMB, and FINAL-C, thus surfacing as **[damaam]**. This hypothesis
poses two problems:
    a. FINAL-C states simply that the Prosodic Word (= Rosenthall's
iambic foot) cannot end in a vowel, and thus it provides no explanation for
why it is the consonant duplicated form the root that is chosen instead of the
least-marked **y**.
    b. According to FINAL-C, it is the Prosodic Word that is prohibited
from being vowel-final. Since PrWd dominates syllables in Prosodic Hie-
rarchy, the right edge of the PrWd (consisting of iambic foot) coincides
with the right edge of the second syllable as in **da.maa]**. The duplicated
consonant in Rosenthall's **da.maa.m** falls outside the PrWd, filling the
onset of the following vowel: **da.maa]mee**, and what follows, is at odds
with the constraint that should motivate its presence.

We propose that this is due to the fact that **-oo.ii** plural type has kept the alignment constraint while loosing sensitivity to the Prosodic word defined by two iambs. Therefore, the constraint has been reformulated in such a way that it requires the coincidence of edges of the simple stem and the one resulting from plural formation (let's call it Stem$_{pl}$).

(48)
ALIGN-STEM$_{PL}$-R
Align(Stem, R, Stem$_{pl}$, R)

This is illustrated in (49), where the Stem$_{pl}$ is marked by vertical bars:

(49) ALIGN-STEM$_{PL}$-R

|gá.ɓóó.ɓíí|	*|gá.ɓóó.yíí|	'joint'
|móó.tóó.číí|	*|móó.tóó.yíí|	'car'
|ál.máá.ɾóó.ɾíí|	*|ál.máá.ɾóó.yíí|	'fable'

2.2.4 Summary

In Newman's (1972) view, adopted in most later analyzes (e.g. Rosenthall 1999, Curtis 2002), "pluralization in Hausa is accomplished by means of two distinct processes: stem preparation, and affix insertion". The first process involves augmenting the stem to the required form, while the second adds a segmental affix along with its tone pattern. Thus, for example the derivation of **ká.fàà.féé** from **ká.fàà** 'hole', consisted of preparing the abstract ˀ**kaff** plus attaching the **-aa.ee** and HLH pattern. Similarly, **tùd.dái** was formed from **tú.dùù** 'hill', by adding the **-ai** suffix plus LH tone melody to the prepared ˀ**tudd**.

By reformulating the prosodic constraint, claimed here to be imposed directly on the output form of the plural, we propose to eliminate the middle, abstract level. Moreover, the current approach, in which the plurals are required to contain two iambic feet, allows us to explain why plurals with one iamb attached (like **-ai**, **-u.aa**)

augment in weight by RED/G (e.g. **(dá.rús)(sàà)** 'lessons'),while similar augmentation is not present in forms like **(dá.ràà)(sáá)**, where the affix already contains two iambs.

Next, by acquiring Hellwig & McIntyre's diachronic approach to Hausa plurals, we have been able to show that the emergence of bi-iambic template has dominated the principles of the former, semantic system consisting solely of tone/final vowel change, and thus laid new foundations for the definition of plural category. Again, reformulation of Newman's constraint on plurals adopted by the authors, allowed us to show that the forms belonging to the alleged suffix system do not augment in weight only when they fulfill the constraint. Thus, being fully sensitive to the iambic requirement, they can be regarded sub-varieties of the prosodic (specifically, iambic) system, rather than representing a post-iambic stage.

The only class that shows no surface alternations pointing to sensitivity towards the bi-iambic constraint, is **-oo.ii**. Nevertheless, it has been developed by satisfying the constraint in question. In other words, rather than being "ignorant", it can be regarded the "ingrate".

We should stress though, that the role of iambic foot, while crucial in shaping the noun plurals, is not restricted to the above. In the following chapter we demonstrate that while word-formation in verbs is more complex than in nouns, iambicity proves to be an equally significant principle shaping this category.

3. The role of iambicity in verbs

3.1 Background to word structure in verb category

The primary trait distinguishing Hausa simple nouns from verbs is that while in the former both tones and the character of final rhyme are mostly lexical, the role they play in the latter is to far more degree determined by morphology. This asymmetry is stressed by Parsons, who even claims that "whereas in the noun, tone is in the main etymological and 'free', in the verbs it is entirely grammatical and linked to the other component of form viz. termination" (Parsons 1960:9). The Parsonian paradigm, in which verbs are ascribed to appropriate terminations, or "grades", has gained a wide acceptance,

being adopted by most of the subsequent synchronic descriptions of Hausa verbal system (Gouffe 1962; Furniss 1981; 1983; Lukas 1963; Newman 1973, 2000 – cf. his historical model, summarized in chapter 3.4 below; Pilszczikowa 1969; Wolff 1993 et al.; for an alternative synchronic description see McIntyre 2008).

According to this framework, grades may manifest their semantic/grammatical distinctions by changing the tonal shape and weight/quality of the verb's ultimate syllable:

(50)
a. change in final vowel quality
     gr3 (**kwáánòò**) **yáá** <u>**cìká**</u> 'the bowl <u>filled</u>'
     gr7 (**kwáánòò**) **yáá** <u>**cìkú**</u> 'the bowl <u>was filled by someone</u>'
b. change in final vowel weight + quality

     gr3a **ƙáurá** 'emigrate'

     gr6 **ƙáuróó** 'immigrate'
c. change in tone + final vowel weight + quality
     gr1 **sàyí** 'buy'
     gr4 **sáyèè** 'buy up'

Tone and weight of the ultima may be further altered in verbs according to syntactic environment. In particular, a verb can surface in four distinct forms depending on whether it is followed by: A – no object, B – personal pronoun direct object, C – any other direct object, or D – indirect object (C-form, which usually ends in a light syllable, is regarded underlying for transitive verbs since Newman (1973)).

Considering the final vowel weight alone, it alternates both within each "grade" and between them. On the other hand, it needs to be emphasized that there is significant divergence with respect to word structure among grades themselves which goes beyond the nature of an ultima: in the light of iambicity, most of the ill-formed items are present in grade 3, which contains a high number of intransitive verbs ending invariably in a short vowel (-**a**/-**i**/-**u**). The class is exceptional in comprising a handful of verbs built of three light (CV.CV.CV) syllables. Interestingly, a number of such words have a

correspondent in other grades (typically in gr1 and gr4) yet with a vowel-syncope, which results in a well-formed iambic structure. This is illustrated by the examples below (verbs appearing in alternative grades retain the original, intransitive spelling if not followed by an object (A-form)):

(51)
    a. g3 ~ g1   Iambic parsing

    fà.ɗá.kà 'awake' ~ **fáɾ.kàà**   **(fáɾ)(kàà)**

    tà.fá.sà 'boil'   ~ **táf.sàà**   **(táf)(sàà)**

    b. g3 ~ g4 (McIntyre 2008)   Iambic parsing

    tà.wá.yà 'shrink' ~ **táu.yèè**   **(táu)(yèè)**

    wà.rá.kà 'get well' ~ **wár**.**kèè**   **(wár)(kèè)**

    yà.ná.kà 'isolate oneself' ~ **yán**.**kèè** **(yán)(kèè)**

cf.   **kù.ɓú.tà** 'escape' ~ **kúɓ**.**čèè** = **kù.ɓú.čéé** **(kúɓ)(čèè)**

    mà.ká.rà 'be late' = **má.kà.réé**

In (51a), the coda-implosive is simplified to /ɾ/ as predicted by Hausa phonology. No reverse strategy (/ɾ/ → /ɗ/) is attested in the language, which suggests that the examples in the right column are syncopated words derived from grade 3 verbs. As seen in (51c), the deletion may violate well-formedness constraints and produce a marked coda. In sum, we assume that the syncope in grade 1 and 4 aims at avoiding the ill-formed iambic foot.

Similar adjustments are exhibited by other classes as well, such as the "efferential" grade 5 which uniquely ends in a consonant -**as** – surfacing as -**ar** in word-final position[12] – e.g. //**zúbás**// > **zúbár** 'pour out': when followed by direct object pronoun, gr5 verbs add final /**-ee**/, which results in restoring the underlying consonant. However, instead of expected ***zúbášéé**, one gets **zúbšéé** with the medial short /**a**/ deleted. Some further examples are given in (52a).

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[12] //**s**// to /**r**/ switch is common in Hausa word-finally, e.g. **marasa** > **maras** > **marar** 'lacking'; **másà** > **mas** > **mar** 3sg. m. indirect object.

Forms with the geminated consonant are found in the same context as well (52b).

(52)
a. vowel-syncope

(ɾá.hám)(šéé) mù 'have mercy (on us)'   *ɾá.há.má.šéé
(wá.hál)(šéé) sù 'cause trouble (to them)'   *wá.há.lá.šéé

b. gemination

(sá.náš)(šéé) kà 'inform (you m.)'   *sá.ná.šéé
(gá.náš)(šéé) kù 'show (you pl.)'   *gá.ná.šéé

Finally, while the weight of the final syllable itself is subject to variation, we demonstrate that morphological categories discussed below do utilize iambic foot along with various strategies of avoiding the opacity driven by grade-marking.

3.2 Verbalizer

3.2.1 Background

Hausa is found to derive verbs from nouns and adjectives by means of a very productive suffix appearing in two forms, further divided into five subvariants (Newman 2000:722). The first form, **-an.taa**, is restricted to around 50 verbs. It attaches to the nominal root with no further adjustments (cf. (53b), in which the -**un.taa** variant occurs as partly conditioned by the noun's ultimate vowel; similarly to plural formation, all the nouns drop the final vowel before the verbalizing suffix).

(53)
a.

fá.ɾàn.táá 'whiten, make happy'   < fá.ɾíí   'white'
nìì.sán.tàà 'be away from'   < níí.sáá   'distance'
jàà.gòò.ɾán.tàà 'lead, guide'   < jàà.góó.ɾàà   'a guide'
kàà.lùù.bà.lán.tàà 'provoke'   < káá.lúú.bà.léé   'a challenge'

b.

gúr.gùn.čéé[13] 'become lame' <   **gúr.gùù**   'cripple'

dù.hún.tàà   'become dark'<   **dú.hùù**   'darkness'

cf.

húú.s'àn.čéé   'become cantankerous' < **húú.s'úú** 'cantankerous'

    The second variant surfaces in one of the three allomorphs depending on the number and weight of the syllables in the attached root: those containing at least two syllables take -**taa**:

(54)

Verbalizer		Noun	Root
a. **tíí.làs.táá** 'to force'	<	**tíí.làs** 'perforce'	/**tii.las**/
b.**hán.zàr.táá** 'hasten'	<	**hán.zá.ríí** 'speed, haste'	/**han.za.ɾ**/
jàà.híl.tàà	<	**jáá.hì.líí** 'ignorant person'	/**jaa.hi.l**/
'be ignorant of sth.'			
c. **mà.rái.tàà**	<	**mà.ráá.yàà** 'orphan'	/**ma.raa.y**/
'become an orphan'			

    Syllable structure of the root remains unaltered in derived form in (54a). In (54b), the stray onset consonant is attached to the coda of the preceding syllable. Derived verb in (57c) further shortens the overweighted syllable (****mà.ráái.tàà** > **mà.rái.tàà**).

    Examples below suggest however that it is not merely the phonotactics that is altering the shape of the category in question. Roots comprising one heavy syllable and a stray onset do not pattern with the ones found in (54c). Instead, they appear with the -**a.taa** suffix attached:

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[13] The quality of final vowel is solely determined by the "grade" – if the vowel is high, it triggers coronal palatalization as in gr. 4 **gur.gun.cee** (← /**gur.gun.tee**/)

(55)

VERBALIZER	NOUN	ROOT
s'óó.ɾà.táá 'frighten'	*s'óɾ.tàà < **s'óó.róó** 'fear'	/**s'oo.ɾ**/
báá.kà.čéé 'cheat'	*bák.čèè < **bàà.káá** 'invitation'	/**baa.k**/

Finally, roots built of a light syllable and a stray consonant form verbs by utilizing the -**aa.taa** ending:

(56)

VERBALIZER	NOUN	ROOT
nù.fáá.tàà 'intend' <	**nú.fìì** 'intention'	/**nu.f**/
s'í.yàà.táá 'impoverish'<	**s'ì.yáá** 'poverty'	/**s'i.y**/

As shown below, the same pattern holds for verbs assigned to grades having a short ultimate syllable. Grade 3 intransitives illustrate the case:

(57)

	VERBALIZER	NOUN	ROOT
a. -ta	**hà.ɾám.tà** 'be unlawful'	**hà.ɾám̀** 'unlawful'	/**ha.ɾam**/
b. -a.ta	**s'òò.ɾá.tà** 'be frightened'	**s'óó.róó** 'fear'	/**s'oo.ɾ**/
c. -aa.ta	**fù.sáá.tà** 'be angry'	**fú.šíí** 'anger'	/**fu.s**/

Summarizing the facts above, the -**an.taa** allomorph, which is attached to the root with no further restrictions, occurs as the least productive. As for the constraints found in the other forms, the choice between short -**a.taa** and long -**aa.taa** appears to be conditioned by the occurrence of – respectively – heavy vs. light initial syllable in a root (**s'óó.ɾà.táá** vs. **nù.fáá.tàà**). Newman (2000) states that what triggers the alternation above is the requirement of "syllable weight polarity", which aims at producing rhythmic asymmetry between the first two syllables. As seen in (54) however, the requirement does not apply to longer roots – disregarding their quantitative make-up, it is exclusively -**taa** suffix that they attach to; consequently, the stray onset is incorporated to the preceding syllable

(with shortening of the latter, if it is heavy): **hán.zá.ríí** > **hán.zàr.táá**; ***hán.zá.rà.táá**; cf. **nú.fìì** > **nù.fáá.tàà**; ***nùf.táá**.

The following section scrutinizes the stated problems, and claims that what underlies the notion of syllable weight polarity is iambicity, shaping the category of denominal verbs as one of the constraints on its size.

3.2.2 Metrical Analysis

Striking similarity between the -**an.taa** and the now-productive -**(aa).taa** form indicates that they are historically related. Indeed, nasal + voiceless consonant sequence is disfavored cross-linguistically, a fact captured formally by the constraint *NC̥ (Pater 1999, Hayes & Stivers 1996). We suggest that Hausa conforms to this general pattern, assuming that the nasal in -**an.taa** underwent lenition, modifying the suffix form to -**a.taa**[14]. Further shortening to -**taa** in longer words appears to have no straightforward phonological explanation (*vide* 61b):

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[14]From a functional point of view, -**an.taa** > -**a.taa** reduction is aimed at simplifying the suffix's structure, and thus we may assume that it is rooted in the same principle that motivates the further reduction of the morpheme (-**a.taa** > -**taa**, discussed below in the section as an example of the the so-called Zipf's laws).

We should stress that the *NC̥ constraint seems to be so far restricted in Hausa to the suffix described, which follows from a general tendency of grammatical morphemes to be less stable than lexical items. However, as argued by Kraska-Szlenk (2009) frequency-driven processes are likely to spread by lexical diffusion. It is interesting to note in this respect, that arguments for nasal weakening in Hausa have already been raised in the literature: in his description of a Hausa text written in *ajami* (Arabic script), Piłaszewicz (1992:26) observes that syllable-final /**n**/ is commonly omitted. Accounting for this, the author claims that a nasal may have merged with a preceding vowel, itself being pronounced very lightly. As such, it could "leave its trace in a lengthened vowel in the writing".

(58)

a. ROOT SIZE	ROOT	NON-PRODUCTIVE FORM	
1 SYLLABLE	**fa.ɾ-**	**fá.ràn.táá**	'whiten'
2 SYLLABLES	**jaa.go.ɾ-**	**jàà.gò.rán.tàà**	'guide'
3 SYLLABLES	**kaa.luu.ba.l-**	**kàà.lùù.bà.lán.tàà**	
			'challenge'

b. ROOT SIZE	ROOT	PRODUCTIVE FORM	
1 SYLLABLE	**ʔuu.w-**	**ʔúú.wà.táá**	'bail out'
	yaa.f-	**yàà.fá.tàà**	'beckon'
2 SYLLABLES	**faa.si.k-**	**fáá.sìk.táá**	'accuse of profligacy'
3 SYLLABLES	**al.kaa.wa.ɾ-**	**ál.káá.wàɾ.táá**	'promise'

Verbs in (58a) are formed by adding the -**an.taa** suffix disregarding the size of the root. On the other hand, the productive -**a.taa** suffix in (58b) shortens to -**taa** when the root contains two syllables or more. Note that the reduction applies even if rendering a highly marked coda in the penultimate syllable (**fáá.sìk.táá** 'accuse of profligacy'; **hà.sáf.tàà** 'apportion', no ***fáá.sí.kà.táá**; ***hà.sà.fá.tàà**).

Accounting for the alternations above, we assume that the -**a.taa** > -**taa** reduction is triggered by the frequent occurrence of the very productive suffix in question. As such, it can be regarded an example of a general invert size/frequency correlation, discussed already in the previous chapter. For the purpose of our discussion, the constraint responsible for the shortening in **a.taa** > **taa** is formulated as NO-2σ-a.taa.

However, as seen in (58b.), morpheme reduction is suspended if it were to yield a word with less than three syllables. It is plausible that the requirement that imposes reduction has no effect on the forms such as **yàà.fá.tàà** 'beckon' as it is dominated by the constraint on the minimal size of the derived verb, which is three syllables, expressed formally as CONTAIN-3σ. This hierarchy is captured by the ranking CONTAIN-3σ >> NO-2σ-a.taa.

The category reveals yet another alternation, which is fundamental to our discussion on iambicity: as shown below, the first syllable of the -**a.taa** suffix is not only subject to total reduction, but also varies in weight depending on the moraic content of the root:

(59)

ROOT SIZE	ROOT	VERBALIZER	
a. 2 moras	**ʔai.k-**	**ái.kà.táá**	'perform, accomplish'
	gay.y-	**gày.yá.tàà**	'invite'
b. 1 mora	**ku.s-**	**kù.sáá.tàà**	'approach'
	ka.w-	**ƙà.wáá.tàà**	'make beautiful'

Bimoraic roots in (59a.) keep the original form of the suffix, while with monomoraic roots, the first syllable of the suffix turns heavy. Crucially, neither CONTAIN-3σ nor NO-2σ-a.taa is responsible for the alternation, since they make reference to the syllables only, disregarding their quantitative make-up. Newman accounts for the change in the affix by referring to the notion of "syllable weight polarity". The requirement is also said to work in certain plural noun classes: compare the first two syllables in pl. **čóó.kú.làà ← čóó.kà.líí** 'spoon' with the geminated pl. **dá.rús.sàà ← dá.rà.síí** 'lesson'. However, we have seen in the previous chapter that what triggers gemination in the latter example is rather the (bi)iambic size constraint imposed on Hausa plurals, which makes other short forms expanded as well, cf. **tú.dùù** 'hill' → (**tuûd**)(**dáá**) = (**tùd**)(**dái**) = (**túd**)(**dú.nàà**) but not *(**tù.dái**); **dá.rà.síí** 'lesson' → (**dá.rús**)(**sàà**) but not *(**dá**(**rú.sàà**) .

Consequently, we propose that it is iambicity that underlies the **a.taa ~ aa.taa** alternation: putting our observations in the light of the metrical structure, we may observe that the minimally trisyllabic denominal forms contain at least two iambic feet (cf. examples below).

(60)   ROOT   VERBALIZER

	ROOT	VERBALIZER	
a.	**ƙar.y-**	**(ƙár)(yà.táá)**	'deny', 'lie'
	bal.g-	**(bál)(gà.táá)**	'damage'
b.	**ƙa.w-**	**(ƙá.wàà)(táá)**	'embroider'
	wa.d-[15]	**(wà.dáá)(tàà)**	'enrich'

As seen in (60a), the **-a.taa** suffix remains unchanged when the form already contains two iambic feet. If it is shorter, initial part of the suffix augments in weight, forming a light-heavy iamb with the root. Apparently, what drives the weight augmentation above, is the iambically-defined constraint on size (CONTAIN-2 IAMBS), already seen to be at play in shaping Hausa plurals.

To be precise, we should add that while the iambic requirement expands the moraic content of the verbalizing suffix when necessary, it cannot enforce any further enhancements by changing the number of syllables:

(61)

	ROOT	VERBALIZER		
a.	**ƙoo.ka.ɽ-**	**(ƙóó)(kàr)(táá)**	*(ƙóó)(ka.ràà)(táá)	'endeavor'
	jaa.hi.l-	**(jàà)(híl)(tàà)**	*(jàà)(hì.láá)(tàà)	'be ignorant of sth.'
b.	**ga.jee.ɽ-**	**(gá.jàr)(táá)**	*(gá.jéé)(rà.táá)	'shorten'
	ma.ɽaa.y-	**(mà.rái)(tàà)**	*(mà.ràà)(yá.tàà)	'become an orphan'

In the examples above, verbalized forms contain three syllables parsed by no less than two iambs already when adding the reduced version of the suffix. Verbs in (61b) further shorten the pe-

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[15]Originally, the noun based on this root was **wadaa** 'wealth', yet, possibly due to its relatively infrequent occurrence with respect to the verb, its etymology has been lost and thus the more accepted form nowadays is the deverbal **wadaataa**.

nult[16]. Significantly, the constraint on bi-iambic parsing does not modify the minimal, trisyllabic structure to optimize the foot form (not *(**kóó**)(**ka.ràà**)(**táá**) but (**kóó**)(**kàɾ**)(**táá**)). This suggests that, while crucially important for the formation of verbalized forms, iambicity requirement is dominated by the two primary constraints mentioned above (CONTAIN-3σ >> NO-2σ-a.taa >> CONTAIN-2IAMBS).

One final proviso has to be made as to the force of CONTAIN-2IAMBS. Forms in (61) reveal that the reduction in size of the suffix may enforce some modifications in the root (cf. vowel shortening in **ma.ɾaa.y** → **mà.ɾái**.**tàà** instead of **mà.ɾàà.yá.tàà**). Iambic requirement, on the other hand, can only expand the syllable weight in the suffix, having no access to alter the shape of the root (compare the weight augmentation in the suffix: **ba.ɾ**- + **a.taa** > (**ba.ɾaa**)(**taa**) 'obtain by begging', with no such adjustments found in the root in **faa.si.k**- + **a.taa** > (**fáá**)(**sìk**)(**táá**), *(**fá.sìk**)(**táá**) or *(**fáá**)(**sì.táá**) 'accuse of profligacy').

In other words, the original shape of the root is maximally preserved at the cost of canonical iambic parsing, being violated only by the constraint on the maximal size of the suffix. Consequently, verbalizer's shape apparently depends on the following ranking of constraints: CONTAIN-3σ >> NO-2σ-a.taa >> IDENT-ROOT >> CONTAIN-2IAMBS >> IDENT-AFFIX.

To sum up this part, we propose that it is CONTAIN-2IAMBS that triggers light-heavy alternation in the suffix. Let us recall however, that the weight asymmetry between the root and the suffix is also present when the particular verb grade makes the final syllable short:

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[16] The overweighted syllable in **gá.jèèɾ.táá** further shortens and centralizes to **gá.jàɾ.táá** (short mid vowels automatically neutralize to /**a**/ in Hausa in non-final position).

(62)

	ROOT SIZE	ROOT	VERBALIZER
a.	1 mora	**fù.s-**	**fù.sáá.tà** 'be angry'
b.	2 morass	**s'oo.ɾ-**	**s'òò.rá.tà** 'be frightened'

Morpho-syntactically conditioned shortening of the final syllable applies to all verbs in Hausa, including the denominal forms. However, though their prosodic structure has been modified, verbalized words – as in (62) – maintain the same light-heavy syllable alternation in the first syllable of the suffix as in words ending with a long vowel. Violation of the requirement on bi-iambic parsing (e.g. (**fù.sáá**)**tà** 'be angry', (**s'òò**)**rá.tà** 'be frightened') does not trigger any adjustments that one would expect (e.g. lengthening of the (ante)penult and marking the final syllable extrametrical, cf. *(**s'òò**)(**ráá**)<**tà**>, *(**fùù**)(**sáá**)<**tà**>).

Opacity of the metrical structure in (62) could be claimed to be driven by constraint ordering (in which shortening of an ultima takes place only after weight-expansion motivated by CONTAIN-2IAMBS).

Another way to address the problem of opacity is to view the alternation as triggered by analogy, which binds the -**aa.ta(a)** ~ -**a.ta(a)** allomorphs with the mono- and bimoraic roots respectively. Such an analysis hinges on the claim that originally, the weight of verb's ultima was free of any morpho-syntactic properties and thus fulfilled the constraint CONTAIN-2IAMBS which triggered the -**a.taa** > -**aa.taa** augmentation – we elaborate on this hypothesis in chapter 3.4. As such, the new template could be viewed as a sole beneficiary of the bi-iambic foot structure which historically defined the category of denominal verbs.

Alternatively, given that the augmentation occurs in the first foot of a word (cf. (**zà.wáá**)**tà** 'be terrified'), yet another approach would ask to reconsider the above definition of the iambic constraint by limiting its size (and changing the subject of its application): an updated version of the constraint would assert that the stem which serves as the base for the verbalized form – abbreviated in the examples below as S_1 – contains at least one iambic foot (for the purpose

of the discussion, the revised size constraint is formulated as CON-TAIN-IAMB). Part of the suffixal material (the initial syllable nucleus, underlined in **s'òò.ɾá.tà** 'be frightened') is incorporated to the stem by the principle of syllable integrity, discussed already in the previous chapter, and therefore can be manipulated to meet the "one iamb" requirement.

(63)
    a. S_1 with at least one iamb: no weight-expansion
    $[[(\textbf{yùn})]_\omega 1 _{(S1)}\textbf{wá.tà}]_\omega 2$ 'be hungry'
    $[[(\textbf{kùn})]_\omega 1 _{(S1)}\textbf{yá.tà}]_\omega 2$ 'be ashamed'

    b. S_1 unparsable: weight-expansion in the suffix
    $[[(\textbf{wù.yáá})]_\omega 1 _{(S1)}\textbf{tà}]_\omega 2$ 'be difficult'   ***wù.yá.tà**
    $[[(\textbf{wà.dáá})]_\omega 1 _{(S1)}\textbf{tà}]_\omega 2$ 'be well off'   ***wà.dá.tà**
    $[[(\textbf{zà.wáá})]_\omega 1 _{(S1)}\textbf{tà}]_\omega 2$ 'be terrified'   ***zà.wá.tà**

Admittedly, further shortening of the suffix to -**taa** would also produce a base with one iamb (as in $*[[(\textbf{wùy})]_\omega 1 _{(S1)}\textbf{tá}]$). We assume that such forms are excluded due to the presence of the aforementioned constraint on the minimal size of the denominal stem (which equals $\omega 2$ in the examples in (63)), that is three syllables (CONTAIN-3σ).

3.2.3 Summary

In its original version, the title category was formed by adding the -**an.taa** suffix to the root without any further requirements. Subsequently, the suffix underwent frequency-driven simplification, its further reduction to -**taa** being suspended only by the constraint on minimal size of the word (CONTAIN-3σ) (cf. **jàà.híl.tàà** 'be ignorant of sth.', but **ƙá.wàà.táá** instead of ***ƙáu.tàà** 'embroider').

Most notably, the contemporary form reveals sensitivity to weight, as the -**a.taa** suffix undergoes expansion determined by the moraic content of the root. All the plausible accounts of this phenomenon hinge on the crucial role of metrical structure.

The constraint already argued to be responsible for augmenting the productive plural nouns (CONTAIN-2 IAMBS) may be claimed to underlie the -**a.taa** ~ -**aa.taa** alternation. However, such an analysis requires further elaboration to address the opacity caused by grade-driven final vowel shortening. Two approaches tackling this issue – derivational and analogy-based – assume different synchronic status of the (bi)iambic constraint: while the former suggests that CONTAIN-2 IAMBS is synchronically active, in the latter it serves as a historical motivation for the development of a template (in which "light" roots pattern with the "heavy" suffix and *vice versa*). Finally, an alternative analysis avoids the problem of opacity by restricting the size constraint to the base comprising one iamb (CONTAIN-IAMB).

The last approach mentioned seems to be best suited to explain the synchronic role of iambicity in the title category. On the other hand, a diachronic analysis of pluractional verbs that we develop in the ensuing section, provides evidence that the constraint CONTAIN-2 IAMBS, seen to augment noun plurals – could have shaped the structure of verbs as well.

3.3 Pluractional verbs

3.3.1 Background

The very productive category in question *(Pluralform des Verbum* in Westermann 1911, "intensive" in Abraham 1941, "pluractional" in Newman 1989 and all the subsequent descriptions of this category in Hausa and other Chadic) typically indicate an action which is multiple, iterative, frequentative, distributive, or extensive – exact meaning being determined by the context[17].

Considering their shape, pluractional verbs are derived mainly by reduplicating the simple stems, and are subject to the same morphosyntactic paradigm described in the introduction to this chapter.

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[17] For this reason, only the simple stems will be glossed here when given in citation forms

(64)

a. **yáá kákkààmá ɓééràà yéé** 'he caught the mice (all of them or one by one)'
cf. **káámà** 'catch' gr1 (H-L-(H)), C-form
b. **mún kákkáámóó yáàráá** 'we caught the children and brought them here'
cf. **káámóó** 'catch and bring' gr6 (H), C-form (all of them or one by one)

The nature of reduplication in pluractionals has varied in time. Newman (1989, 2000) distinguishes two major types with this respect:

Table 5.

REDUPLICANT	PRODUCTIVITY	EXAMPLES
-CVC- INFIX (NEWMAN 2000) (analyzed as **-CVCV SUFFIX** in NEWMAN, 1989)	MARGINAL	**má.kà.léé** → **má.kál.kà.léé** 'attach'
CVC- PREFIX	FULL	**tàm.bá.yàà** → **tàt.tàm.bá.yàa** 'ask sb.'

As seen in the preceding table, the most productive principle is prefixal CVC reduplication. In turn, the strategy to infix the CVC duple (or add a CVCV suffix, as analyzed earlier by Newman; cf. discussion which follows) is hardly common, with many verbs having lost their pluractional reading as well as the non-derived counterparts (and thus are called the "frozen pluractionals"), yet some – their application restricted to trisyllabic simple verbs – are still active.

Note that one of the basic traits indicating that "frozen" verbs functioned historically as pluractionals is the use of reduplication, which still serves to augment the verb base in synchronically productive pluractional forms. There are, however, some other formations that parallel the ones mentioned with respect to three following features:

- internal augmentation
- loss of originally encoded semantics
- loss of non-derived counterparts

On the other hand, their means of augmentation is not attested in synchronic pluractional forms. Moreover, semantically bleached, they offer no credible signs of being members of this category. Thus, Hausaists generally do not recognize them as such. Notwithstanding the above questions, Newman (1990b:97) analyzes these verbs as "other possible frozen pluractionals", distinguishing two main formation principles:

1) Medial gemination[18], e.g. **ƙwál.là.fáá** 'long for'

2) /**aa**/-insertion, onsetted by the reduplicated consonant,

a. prefixal, e.g. **wáá.wà.sáá** 'scramble for'

b. infixal, e.g. **fí.yàà.yéé** 'go moldy'

If we assume that the two formations in question constitute, along with reduplication, one category of pre-modern pluractionals, we should note that they draw on the same principles of formation that shaped the plural nouns at the so-called "iambic stage" described in chapter 2. We elaborate on this thought further below.

Now as already mentioned, in the course of their development, pluractionals have retained reduplication as the only means of formation, the duple being further moved to the prefix. Newman (2000:427) argues for the same origin of the two forms. Claiming that the pre-modern forms placed the duple in the antepenultimate position, the author observes that when dealing with disyllabic simple verbs, such reduplication resulted in placing the CVC sequence

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[18] The author mentions that pluractionals in other Chadic (specifically in Pero and other languages from Bole group) are also augmented by gemination.

74

word-initially (coda consonant neutralized according to the rules described in Newman 2000:234). A thorough analysis of Hausa reduplication by Yakasai (2006) calls for a similar approach:

(65) ANTEPENULTIMATE REDUPLICATION
trisyllabic stem
tá.fà.sáá → tá.fár̃.fà.sáá 'boil sth.'
cf. disyllabic stem
fá.sàà → fár̃.fà.sáá 'break sth.'

According to the above authors, the pattern was later reformulated so that the prefixal reduplication started to function as the norm (note also that full assimilation of the reduplicated coda consonant, earlier phonologically conditioned, has developed into a general rule):

(66)
PREFIXAL REDUPLICATION
fá.sàà	→	**fáf.fà.sáá**	'break sth.'
tá.fà.sáá	→	**tát.tá.fà.sáá**	'boil sth.'
tàm.bá.yàà	→	**tàt.tàm.bá.yàà**	'ask sb.'

The claim for the common source of pluractional reduplication is originally made in Newman (1989), where the author assumes that pre-modern pluractionals use suffixal -CVCV reduplication. According to this approach, the switch to the prefix was encouraged by the fact that original roots in derived verbs are more deformed by the regular phonological processes than the duple itself (cf. coda neutralization in the first syllable). Language user was thus prone to regard the deformed root as the affix. The misinterpretation made the rule reformulated, which subsequently led to diffusion regardless of the base structure:

(67)

PRE-MODERN PLURACTIONAL		MODERN PLURACTIONAL	
fìtá → fír.fì.tá	'go out'	bú.gàà → búb.bú.gàà	'beat'
ˀgí.zàà → gír.gì.záá	'shake'	zàà.bú.ràà → zàz.zàà.bú.ràà	'jump up'

In sum, we may assume that originally, pluractionals employed three principles of formation: reduplication (RED), gemination (G), and the insertion of long /**aa**/ (A-INS). Subsequently, RED started to serve as the only means of formation, the duple being further moved to the prefix.

The ensuing section analyzes pluractional verbs in the light of prosodic structure, providing evidence that iambicity played a key role in shaping pre-modern pluractionals and contributed to the establishment of the prefixal template, by which the contemporary forms are defined.

The description is based on the data provided by Newman (1989, 1990, 2000). For convenience, the verbs are cited in grades that end invariably in long vowel, and are in A-form (i.e. without the following object), used conventionally in Hausa dictionaries and grammars.

3.3.2 Metrical analysis

It has already been noted that pre-modern pluractionals draw on the same principles of formation as "iambic" noun plurals. This fact may encourage us to look for iambic footprints in derived forms starting from the group mentioned.

Before we begin our analysis, it is necessary to state that a close scrutiny of the pre-modern forms encounters difficulties as some of the derived verbs were stripped of their originally encoded semantics, and many of the simple stems that served as sources for the derivation no longer exist – Newman calls this group of verbs "frozen pluractionals". Nevertheless, there are cases in which the "frozen verb" can be assigned to the now-occurring simple stem, though with their relation being phonologically and semantically bleached. Furthermore, pre-modern formation can still be found to play synchronically active role in shaping pluractionals. As will be

shown below, a close examination of all of such verbs reveals that their structure is constrained by iambicity.

Newman (2000:519) observes that "the penultimate vowel of frozen pluractionals is invariably short, i.e. there is a metrical opposition between the heavy antepenultimate syllable and the light penult". If necessary, long penult shortens in derived forms. Following examples illustrate the alternation:

(68)

yáy.**yà**.fáá	'sprinkle'	cf. **yáá**.fàà	'sprinkle', 'scatter'
ɗài.**dá**.yàà	'strip off epidermis'	cf. **ɗàà**.yáá	'strip off bark'
ɗán.**ɗà**.náá	'measure'	cf. **ɗáá**.nàà	'taste'
s'ás'.**s'à**.láá	'do excessively'	= s'**áá**.làà	
kìr.**kí**.ràà	'invent', 'start'	cf. **kéé**.ràà	'manufacture'[19]

In (68), long stem-initial vowel in simple verbs alternates with a short penult in derived cognates (**yáá.fàà → yáy.yà.fáá**). While under Newman's (1989) approach the shortening would be driven by the restrictions on the shape of the -CV.CV suffix itself, observe that in quadrisyllabic pre-modern forms, initial syllable remains short as well:

(69)

SIMPLE STEM			PLURACTIONAL
zàà.ká.làà	'eat greedily'	=	**zà.kàl.ká.làà**
dàà.gá.zàà	'eat lots of sth.'	=	**dà.gàr.gá.zàà**
čáá.bù.léé	'be muddy', 'slushy'	=	**čá.bál.bà.léé**
dáá.mù.léé	'be muddy'	cf.	**dá.mál.mà.léé**
			'be confused'

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[19] **ee → i** switch is fully regular as medial short vowels /o/, /e/ do not occur in Hausa non-finally.

Pluractionals in (68) and (69) display a (light-)heavy-light-heavy metrical alternation. Shortening of the penultimate (e.g. 63) and initial (69) vowel enhances the durational contrast between the syllables in derived verbs[20]. It was mentioned in the introduction to the study that, according to Iambic/Trochaic Law (Hayes 1995), syllables contrasting in duration form groupings with final prominence.

Similar kind of metrical asymmetries is constantly preserved in the still-active forms (i.e. the ones with pluractional reading preserved): in the examples below, where verbs are derived from stems with a closed initial syllable – all of them being Arabic loanwords with internal geminates – the coda undergoes deletion, thus creating a light-heavy-light-heavy iambic pattern:

(70)

hál.là.káá	'destroy'	→	**há.lál.là.káá**	*****hál.lál.là.káá**
šáw.wà.ɾáá	'ponder'	→	**šá.waɾ.wà.ɾáá**	*****šáw.waɾ.wà.ɾáá**

Let us also note that the prosodic structure of both geminated, and "internal /**aa**/" verbs – regarded by Newman (1990) as other representatives of frozen pluractionals – is conditioned in the same way as of the pre-modern reduplicated verbs.

Regarding the shape of G-verbs (in most cases, it is sonorants that are geminated), they consist typically of three syllables, the

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[20] Since all the quadrisyllabic reduplicated verbs are derived from simple forms with a long initial /**aa**/, we could alternatively assume that the alleged simple forms are actually alternative pluractionals produced by /**aa**/-insertion: †**dà.gá.zàà → dà.gàɾ.gá.zàà** or **dàà.gá.zàà**.

However, as mentioned further below in the paper, /**aa**/-insertion is regarded to be applied uniquely to disyllabic simple stems (Newman 2000:520), and none of such examples is found to have an alternative reduplicated pluractional.

Nevertheless, we do find at least one example in support of the hypothesis above, where the geminated trisyllabic pluractional has an alternative verb with /**aa**/ insertion:

súl.lù.ɓéé = sáá.lù.ɓéé = súl.ɓèè (< †**sú.lù.ɓéé**) 'peel off'.

second being invariably short (vowels in capitals given in the right column indicate that their actual length is unknown):

(71)

PLURACTIONAL VERB			SIMPLE VERB
ƙwáz.zà.báá	'pester'	=	ƙwá.zà.báá
dál.là.fáá	'stick close to'	←	†dÁ.lÀ.fáá
ƙʷál.là.fáá	'long for'	←	†ƙʷÁ.lÀ.fáá
dín.nì.káá	'fill with smoke'	←	†dÍ.nÌ.káá
gáy.yà.ráá	'suffer trouble'	←	†gÁ.yÀ.ráá
ʔás.sà.fáá	'look after carefully'	←	†ʔÁ.sÀ.fáá
súl.lù.ɓéé	'peel off'	=	súl.ɓèè < †sÚ.lÙ.béé

(Note also **dár.rà.šéé** 'sit relaxed', with an alternative, reduplicated form: **dá.rár.rà.šéé**)

Similar metrical conditions are imposed on the verbs augmented by long /**aa**/ prefixed to the stem (72a). Conversely, in the forms that insert long /**aa**/ to the penult (as in 72b), it is the first syllable that is constantly preserved short[21]. According to Newman (2000:520), the category consists of trisyllabic derived verbs, in which the long /**aa**/ is onsetted by the consonant copied from the disyllabic stem:

(72)

	PLURACTIONAL VERB			SIMPLE VERB
a.	Prefixal /**aa**/			
	wáá.wà.sáá	'scramble for'	←	†wÀ.sáá
	gàà.gá.ràà	'be impossible'	←	†gÁ.ràà
	ràà.rú.màà	'grab', 'snatch'	←	†rÚ.màà
	láá.lù.báá	'grope'	←	†lÙ.báá

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[21]Short vowel in forms like (75a) stands either for /**a**/, or /**u**/, while in (75b): /**a**/, /**u**/ or /**i**/.

b.   Infixal /**aa**/

fí.yàà.yéé	'go moldy'	←	†**fÌ.yéé**
ɲì.ɓáá.ɓàà	'drink large amount of'	←	†**rÍ.ɓàà**
sú.làà.láá	'sneak into'	←	†**sÙ.láá**
tá.kàà.kéé	'establish mastery over'	←	†**tÀ.kéé**
sà.ɗáá.ɗàà	'go stealthily'	←	†**sÁ.ɗàà**
mà.láá.làà	'flow or spread over'	←	†**mÁ.làà**

To sum up this part, pre-modern pluractionals constantly pre-serve syllable-weight asymmetry. When necessary, reduplicated forms shorten the initial/penultimate syllable to enhance the dura-tional contrast. Newman (1990:96) argues that "shortening takes place in line with the metrical rhythmic feel of pluractionals". Ac-cording to Newman (2000:437) and Jaggar (2001:282) the feel is iambic.

(73)
IAMBIC PARSING IN PRE-MODERN REDUPLICATED PLURACTIONALS
(a)trisyllabic: $(\sigma_{\mu\mu})(\sigma_\mu \sigma_{\mu\mu})$ (b)Quadrisyllabic: $(\sigma_\mu \sigma_{\mu\mu})(\sigma_\mu \sigma_{\mu\mu})$

(ài)(dá.yàà)	**(zà.kàl)(ká.làà)**
(s'ás')(s'à.láá)	**(dà.gàr)(gá.zàà)**
(šá.war)(wà.ráá)	**(čá.bál)(bà.léé)**
(há.lál)(là.káá)	**(dá.mál)(mà.léé)**

Penultimate (68,73a), as well as word-initial (69,73b) vowel reduction aims at the enhancement of durational contrast within the canonical $(\sigma_\mu \sigma_{\mu\mu})$ iambic foot. Reduplication abetted by the con-straint on iambic parsing yields bi-iambic formations. Other frozen pluractional verbs share the same shape: **(wáá)(wà.sáá)**, **(sú.làà)(láá)**, **(kʷál)(là.fáá)**. The assumption on the same prosodic

structure constraining pre-modern pluractional verbs and iambic plural nouns is borne out.

Now that we established the role of iambicity in pre-modern derived verbs, it is worth to note that the structure preserved in such forms points to the fact that at some point in time, iambicity emerged in simple verbs as well. Consider the following:

(74)

SIMPLE VERB			PLURACTIONAL VERB
a. **tár.s'èè**	'smash'	→	**tá.rár.rà.s'éé**
hài.fáá	'give birth'	→	**hà.yài.yá.fàà**
b. **táu.šèè**	'press down on'	cf.	**tá.kʷár.kʷà.šéé** 'be weighed down by age'
c. **súl.ɓèè**	'peel off'	=	**súl.lù.ɓéé = sáá.lù.ɓéé**
d. **kár.yàà**	'break' (cf. g3 **kà.rá.yà**)	→	**ká.rái.rà.yáá**

Pairs in (74) are idiosyncratic: disyllabic simple verbs correspond to reduplicated pluractionals consisting of four syllables. Verbs in (74b) are unarguably cognates, yet phonologically they vary from each other quite substantially: vowel-syncope in the simple disyllabic verb made the labialized consonant – preserved in the derived quadrisyllabic form – loose its onset position. Consequently, it was neutralized in the simple verb's coda according to the so-called Klingenheben's Law[22] ([†]**tá.kʷá.šéé** → /**ták**ʷ**šéé**/ → **táu.šéé**). Phono-

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[22] "Klingenheben's Law" refers to a set of historical rules aimed at neutralizing codas in Hausa (for a detailed discussion, see Newman 2004). According to these rules:

a. velars and labials weakened to /**u**/:**záu.ɗàà** 'move aside' < [†]**zák.ɗàà**, cf. doublet **záá.kù.ɗáá**; **ʔáu.réé** 'mariage' = **ʔám.réé** in Western Hausa, cf. **ʔá.már.yáá** 'bride'

b. coronals changed to rolled **r**: **fár.kàà** 'wake up' = **fà.ɗá.kà**

It is interesting to note that among those of the items affected by KL which can now be reconstructed, most originally consisted of a sequence of two or more light syllables, i.e. were ill-formed under iambic structure, e.g. **záu.ɗàà** < **ʔzá.kù.ɗáá**; **ɗáu.réé** < **ɗá.ma.réé**; **fár.kàà** = **fà.ɗá.kà**. Thus, it is reasonable to ask whether KL was a by-product of iamb-driven vowel deletion. We leave this question open.

logical distance reflects slight semantic divergence between two verbs, and may explain the loss of originally encoded, pluractional reading in the derived form.

Quadrisyllabic pluractionals are formed on the basis of trisyllabic verbs. Furthermore, **kà.ɾá.yà**, a grade 3 counterpart for the syncopated verb g1 **káɾ.yàà** found in (74d), suggests that the vowel which underwent reduction was light, i.e. the original base for the derived form **ká.ɾái.ɾà.yáá** was †**ká.ɾà.yáá**. The reason standing behind the rule of syncope is obvious in the light of metrical theory: iambic languages strain from a sequence of two light syllables – a repair strategy is employed to avoid it and to produce a well-formed foot. Vowel-reduction phenomenon is widely embraced in iambic languages. Formally, constraints responsible for the exhaustive iambic parsing are PARSE-σ and FOOTFORM=IAMB. They require that the partially parsed ***ká**(ɾà.yáá) or the ill-parsed (**ká.ɾà**)(**yáá**) be shunned in favor of (**káɾ**)(**yàà**).

Newman (2000:428) reconstructs the stems from which the pluractionals in (74a) are derived as //**ta.ɾa.s̩ee**//, //**ha.ya.faa**//. Similarly, the base for **tá.kʷáɾ.kʷà.šéé** 'be weighed down by age' is plausibly //**ta.kʷa.šee**//, and for **súl.lù.ɓéé = sáá.lù.ɓéé** 'peel off' - //**su.lu.ɓee**//. Reduction of the light penultimate syllable is fully predictable under the constraint on iambic parsing.

Observe that iambic requirement – revealed by the alternations above – emerged in simple verbs only after it was established in derived forms, as we find the pre-modern, bi-iambic pluractionals built on the basis of CV.CV.CVV simple verbs. This is illustrated below:

(75)

a.　STEP I

PRE-IAMBIC SIMPLE VERB			IAMBIC PLURACTIONAL
†**ká.ɾà.yáá**	'break'	→	**ká.ɾái.ɾà.yáá**
†**tá.ɾà.s'éé**	'smash'	→	**tá.ɾáɾ.ɾà.s'éé**
†**hà.yài.yá.fàà**	'give birth'	→	**hà.yài.yá.fàà**
†**tá.kʷáɾ.kʷà.šéé**	'press down on'	→	**tá.kʷáɾ.kʷà.šéé**
†**sú.lù.ɓéé**	'peel off'	→	**súl.lù.ɓéé = sáá.lù.ɓéé**

b.   STEP II
PRE-IAMBIC SIMPLE VERB   PARSE-σ, FOOTFORM=IAMB

†**ká.ɾà.yáá**   'break'   →   **káɾ.yàà**

†**tá.rà.s'éé**   'smash'   →   **tár.s'éé**

†**hà.yá.fàà**   'give birth'   →   **hài.fáá**

†**tá.kʷà.šéé**   'press down on' →   **táu.šéé**

†**sú.lù.ɓéé**   'peel off'   →   **súl.ɓèè**

    Through these development stages we are able to explain the idiosyncrasies found in the relation between the present simple verbs and their pre-modern pluractional counterparts. Significantly, the two steps above reveal that the role of iambicity increased in verbs in the course of their development, since the metrical requirement – established first in derived forms – paved its way to simple stems.

    Finally, we have seen in the introduction to this chapter that in modern pluractionals, RED started to serve as the only means of formation, and the reduplicant was moved to the prefix. As mentioned, Newman (2000) attributes this switch to the fact that such pre-modern, infixal reduplication actually surfaced as word-initial when applied to stems consisting of less than three syllables (e.g frozen **ɓáɓ.ɓà.kéé** 'uproot' ← ˀ**ɓá.kèè**). Thus, at some point in time, the new template developed on analogy with short verbs. Indeed, reduplication in verbs may be considered prone to such a switch, since, as pointed out by Pawlak (1998), mono- and disyllabic verbs are among the most frequently used in Hausa. More generally, Newman (2000:409) states that "the norm for basic monomorphemic words [in Hausa] is disyllabic"[23].

    Interestingly, examples of simple verbs is given in (75b), reconstructed on the basis of the structure preserved in pre-modern, iambic pluractionals, show that Hausa in fact once consisted of a

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[23]Among monomorphemic, historically non-derived Hausa verbs, we found none that would exceed three syllables.

larger number of verbs containing more than two syllables. These were subsequently shortened due to the emergence of iambic requirement in simple, non-derived forms. This is illustrated below.

(76)
RED –   PRE-IAMBIC SIMPLE VERB > IAMBIC SIMPLE VERB – RED 2
a. **sá.rár.rà.ḱéé** ← †**sá.rà.ḱéé** 'intertwine'   **sár.kèè**   →   **sás.sàr.ḱéé**
    tá.rár.rà.s'éé ← †**tá.rà.s'éé** 'smash'   **tár.s'éé**   →   **tát.tàr.s'éé**
    gí.rír.rí.má ← †**gì.rí.mà** 'grow up'   **gír.má**   →   **gíg.gír.má**
b. **sá.kʷár.kʷà.čéé** ← †**sá.kʷà.čéé** 'be slack' †**sáu.čèè**   →   **sás.sàu.čéé**²⁴

    Thus, it is not without reason to argue that iambicity actually contributed to the establishment of the new template in pluractionals inasmuch as it got rid of CV.CV.CV(V) structures, deemed ill-formed: reformulation of RED-placement on analogy with short verbs was encouraged by the increase in the number of disyllabic forms.

    Admittedly, we do still have some ill-formed simple verbs in the language, such as **gú.s'ù.ráá** 'break into pieces', or **rí.kì.táá** 'confuse'. Nevertheless, it is worth noting that all of such words utilize pre-modern, "iambic" pluractional formation as an alternative to the prefix. The resulting structure – unlike the modern form which leaves a syllable unfooted/ill-parsed – is fully parsable in iambic fashion:

(77)
    SIMPLE VERB   IAMBIC PLURACTIONAL   PREFIXAL PLURACTIONAL
    <**gú**>(**s'ù.ráá**)   (**gú.s'ús'**)(**s'ù.ráá**)   (**gúg**)<**gú**>(**s'ù.ráá**)
          'break into pieces'
or: (**gú.s'ù**)(**ráá**)   or: (**gúg**)(**gú.s'ù**)(**ráá**)

    <**rí**>(**kì.táá**)   (**rí.kír**)(**kì.táá**)   (**rír**)<**rí**>(**kì.táá**)
          'confuse'
or: (**rí.kì**)(**táá**)   or: (**rír**)(**rí.kì**)(**táá**)

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²⁴ RED 2 **sás.sàu.céé** is itself a frozen pluractional, which suggests that the RED reformulation is not a new development.

<rí>(kì.ɗáá)   (rí.kír)(kì.ɗáá)   (rír)<rí>(kì.ɗáá)
      'metamorphose'

or: (rí.kì)(ɗáá)   or: (rír)(rí.kì)(ɗáá)

<há>(ɗi.yáá)   (há.ɗíí)(ɗi.yáá)   (háh)<há>(ɗi.yáá)
      'swallow'

or: (há.ɗi)(yáá)   or: (háh)(há.ɗi)(yáá)

<má>(ƙà.léé)   (má.ƙál)(ƙà.léé)   (mám)<má>(ƙà.léé)
      'attach'

or: (má.ƙà)(léé)   or: (mám)(má.ƙà)(léé)

     In fact, close examination of the data suggests that the application of pre-modern pluractional formation is nowadays in great part restricted to the forms such as above. In other words, it seems that the productivity of pre-modern pluractionals has decreased proportionally to the decrease in the number of ill-formed simple verbs, i.e. its status in the contemporary language is as marginal as the occurrence of CV.CV.CVV forms.

3.3.3 Summary

     At its earliest stage of development, pluractional formation most probably employed the same principles of augmentation as "iambic" plural nouns, which include reduplication, gemination and insertion of internal /**aa**/. Likewise, it revealed full sensitivity towards iambicity, which can be drawn on the basis of rhythmic asymmetries preserved constantly in the frozen forms. Moreover, both frozen and productive RED-pluractionals are proved to utilize vowel/consonant deletion in order to enhance durational contrast between the syllables. Needless to say, derived verbs surface with two iambic feet, as shown below:

(78)

SIMPLE VERB			PLURACTIONAL VERB
kál.là.méé	'sweet talk s.o.'	→	**(ká.lál)(là.méé)**
šáw.wà.ɾáá	'ponder'	→	**(šá.wáɾ)(wà.ɾáá)**
yáá.fàà	'sprinkle', 'scatter'	cf.	**(yáy)(yà.fáá)** 'sprinkle'
ɗàà.yáá	'strip off bark'	cf.	**(ɗài)(ɗá.yàà)** 'strip off epidermis'

Furthermore, pluractionals themselves provided us with further evidence for historical modifications that took place in simple verbs: a number of derived forms are created on the basis of simple verbs which subsequently underwent vowel-deletion (accompanied by regular phonological adjustments). Basing on external evidence (cf. grade 1 **káɾ.yàà** vs. **kà.ɾá.yà** still occurring in the "conservative" grade 3, and reflecting the original base †<**ká**>(**rà.yáá**) from which the pluractional (**ká.ɾái**)(**rà.yáá**) is derived), we have shown that the rule of syncope is aimed at avoiding the forms that would leave a syllable unfooted. The phenomenon of vowel-deletion described above suggests that, subsequently to derived forms, iambicity emerged in simple verbs as well.

Finally, an increase in the number of disyllabic verbs strengthened the motivation for reformulating the RED-placement to the prefix. On the other hand, while some of the ill-formed simple verbs still occur in the language, all of them utilize the pre-modern pluractional formation, which makes the output neatly parsed, unlike the prefixal template (cf. 80).

* * *

Having provided the evidence for the emergence of iambicity in Hausa verbs, let us now return to a more general issue, mainly to the problem of final syllable weight: it was emphasized in the beginning of this section that all the examples of simple and pluractional verbs above would – for convenience – be cited invariably with a long final vowel. We need to bear in mind, however, that the weight of the ultimate syllable in Hausa verbs is morpho-syntactically de-

86

termined, and therefore is subject to variation. Consequently, when derived forms engaging penultimate vowel-shortening take a grade with a light ultima (e.g. grade 1 in C-form, **tát.tà.rà** 'collect things', cf. **táá.rà** 'collect'), the resulting structure undermines our claim on iambicity triggering such modifications, thus raising the problem of opacity. We address this problem in the following chapter. Specifically, drawing on the claim made by Newman (1973) about the nature of Hausa "grades", or "extensions", we hypothesize that by the time iambic structure has been established in pre-modern pluractionals, the final syllable of a verb was actually free of any semantic/syntactic roles that would alter its weight, thus willing to serve as the head of an iambic foot.

3.4 Problem of the final-syllable weight: Newman's extensions

Acknowledging the Parsonian grade system for its usefulness as a frame of reference for (almost) all Hausa verbs, Newman (1973) provides an insightful critique of its very foundations[25]. Accounting for all the inconsistencies of the grade paradigm, the author develops an alternative, historical model of Hausa verbal system along the lines of the pattern found in other Chadic languages.

In particular, Newman notes that Chadic verbs can be divided into two (lexically arbitrary) groups according to the final vowel quality. Thus, verbs usually end either in low -**a** or in a non-low vowel (-**i**, -**u**, or -**ə**). This dichotomy is expressed in Hausa by grades 1 and 2 respectively (the distinction, illustrated by the pair **káámà** 'break' gr1 vs. **ɗàukí** 'take' gr2, manifests itself in a pre-noun C-form, which is therefore regarded underlying). Unlike in Parsonian

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[25]At the core of the grade system developed by Parsons lies the assumption that a verb (such as **fítóó** 'come out') consists of an abstract base (//**fit-**//) with its general semantics encoded. The base is stripped of its tone shape and final vowel, provided only by one of the seven grades which may further modify the meaning (e.g. H tone -**oo** "ventive grade (VI)"). Two main consequences follow from this statement:

1) every base can occur with every grade
2) the grades are mutually exclusive (i.e. only one can be attached to a base at a time).

grade system, the above-mentioned final vowels are regarded lexically specific, rather than morphologically determined[26].

Moreover, what is crucial for our hypothesis which follows, the author observes that generally in Chadic, the meaning of "basic" verbs may be optionally modified/expanded by adverbial-like extensions. In languages like Tera, these extensions surface as distinct adverbial particles (e.g. **ɓara** in **mbukə ɓara** 'throw away', cf. **mbukə** 'throw'). In others, such as Margi, they are derivational suffixes, e.g. **kʷàsənyà** 'eat up' cf. **kʷàsə́** 'eat'.

A substantial difference between Hausa and its cousins lies in the fact that the "grades" in the former are usually marked by final vowel and tone pattern alone. As a consequence, they cannot simultaneously manifest their presence on one verb (i.e. a verb cannot appear with two tone patterns or two vowel terminations), while other Chadic allow the extensions to combine freely with basic verbs. This claim can be verified by the cases in which grades are marked by some additional elements, and thus the combination of grades may occur:

(79)

	Basic Verb	Grade	Grade Combination
a.	**čí**	**čín̂yè** gr 4	**čìnyú** gr 4+7
	'eat'	'eat up'	'have eaten up'
b.	**fítá**	**fid.dàà** gr 5d	**fid.dú** gr 5d+7
	'go out'	'take out'	'have been taken out'

In (79a), a "totality" extension (which corresponds to grade 4 in Parsons' paradigm) appears with a -C.CV suffix as a variant used with monosyllabic verbs (e.g. **čí** 'eat' + **-nye** *totality* → **čín̂yè** 'eat up') and as such it may co-occur with other extensions (e.g. **-u** *sus-*

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[26] In his earlier approach, Newman (1973) considered tones as being lexically distinctive as well, yet in Newman (2000), tonal patterns are claimed to be (at least historically) determined by transitivity: **a**-verbs were transitive if HL and intransitive if LH (eg. **cíkà** 'fill' vs. **cìká** 'be filled'), while with **i**-verbs, the case was opposite: LH verbs were transitive (e.g. **nèèmí** 'seek'), and HL- intransitive (e.g. **fáádì** 'fall').

tentative : **čìnyú** 'have eaten up'), avoiding the risk of being totally erased on the surface. The case is similar with the "decausative" grade 5d, marked by -**dàà** suffix (79b).

Accounting for the restrictions (which are considered peculiar in the light of the extensions' nature in other Chadic languages), Newman states that in modern Hausa, extensions have become radically reduced and eventually "fused into the verb", which made them hardly possible to combine with each other. The author adds though, that "before the modern period, Hausa extensions must also have had a greater degree of combinatory freedom" (Newman 1973:321), which implies that they were minimally of -CV shape.

Newman furthermore notes that the consequences of the extreme phonological reduction of Hausa extensions went far beyond the co-occurrence restriction: for example, some extensions have merged with the basic (**a**-and **i**-) verbs[27], distorting a clear-cut distinction between the two classes.

To sum up, Newman (1973) argues that Hausa extensions were originally longer, as in other Chadic languages, and therefore the verb's ultimate vowel was free of any morpho-syntactic properties. Subsequently, the extensions were phonologically reduced, leading to a situation in which the verb's ultima has lost its lexical properties. The author states that "once this happened, it could not have been long before basic verbs would be stripped of their final vowel [...], which would then become the property of stem formatives" (Newman 1973:331).

As seen above, phonological reduction of extensions made verbs bleed in two ways: it restricted the opportunity of their co-occurrence, and made the distinction between two basic verb classes

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[27] Two such extensions are distinguished. The first one, "partitive-displacive", "indicates that the action affects a part of the object or involves removal or displacement of the object" (Newman 2000:681). Since the reduced form nowadays ends in -**i** (plus LH tone shape), it has merged with the basic **i**-class. The second, termed "applicative", "directs the action onto the object (...) or onto a location" (Newman 2000:681). Surfacing synchronically with final -**a** and a HL tone pattern, it is indistinguishable from the basic **a**-verbs.

opaque. We argue that what has also become opaque because of the reduction is the iambic template used in verbal categories described: Referring to Newman's observations, we hypothesize that during the establishment of iambic requirement in pre-modern pluractionals, the final syllable of the verb was free of any morphological roles that would alter its weight, thus willing to serve as the head of the iambic foot. The parsing was possible for, should the verb be determined for the roles mentioned above, they were encoded in the extensions which at the time were *cliticized* to the verbal stem. Our hypothesis can be illustrated by reference to the archaic form of "totality" extension, which nowadays still operates some monosyllabic verbs, e.g. **šán.yè** 'drink up' (cf. **šáá** 'drink'). Given the insights made by Newman (1973), we can assume that at an earlier period extensions exhibiting such a structure could have been as well attached to longer forms, as in †**yáy.yà.fán.yè** 'scatter all the seeds', which allowed for the pluractional verb to be parsed bi-iambically: †**(yáy)(yà.fán)yè** (cf. modern **yáy.yà.fè**).

Subsequent merging of the radically reduced extensions with the stem, accompanied by iambically driven reduction in the size of CV.CV.CV(V) words, made Hausa verbs exceptional in having such a considerable functional load encoded in a relatively short word structure. This only encouraged reformulating of pluractionals to prefixal reduplication, considered far less interfering in the internal structure of the short verbal stem than the older principles. On the other hand, longer stems retain the pre-modern type of reduplication as an alternative to the prefix (cf. **[rí.kì.ɗáá]** 'metamorphose' → [**rír [rí.kì.ɗáá]**] vs. [[**rí.kír.kì.ɗáá]**]).

5. Conclusion

The study has developed a synchronic and diachronic analysis of the role of iambic template in defining various morphological categories in Hausa. By tracing the historical development of noun plurals, we were able to establish that, at the earliest stage, the latter was determined solely by the tone shape along with the vowel quality. Subsequently, the emergence of bi-iambic template has laid new

foundations for the definition of plural category, serving as the main principle of its formation.

Similarly, a close examination of two morphological categories found in verbs – namely of pluractionals and the so-called "verbalizer" – provided us with robust evidence that iambicity has been established as one of their defining principles.

In chapter 3.2 we demonstrated that the verbalizing suffix, which was originally the sole formation principle of denominal verbs, underwent frequency-driven reduction. Consequently, a minimality constraint has been established in the category to ensure its salience, thus creating -**a.taa** ~ -**taa** suffix allomorphy. As also presented, the morpheme undergoes further (-**a.taa** → -**aa.taa**) augmentation determined by the moraic content of the root. We argue that it is iambic requirement on size that triggers the alternation.

As presented in (3.3), rhythmic asymmetries do occur in pluractional verbs as well. Following Newman (1989, 1990), we assumed that originally the category made reference to three means of augmentation (RED, G, A-insertion), similarly to iambic plural nouns, and surfaced with two iambic feet. Moreover, the idiosyncrasies found among the present simple verbs and their pre-modern pluractional counterparts (cf. disyllabic **hài.fáá** 'give birth' vs. quadrisyllabic **hà.yài.yá.fàà**) suggest that once the inventory of ill-parsed CV.CV.CVV forms was larger. Subsequently, such items underwent vowel-syncope, their original structure being preserved only in derived verbs/ "conservative" grade 3. This phenomenon reveals that the role of iambicity increased in verbs in the course of their development, since the metrical structure – originally constraining derived forms – paved its way to simple stems (as illustrated by the historical development of **hà**.**yá.fàà** > (**hà.yài**)(**yá.fàà**) > (**hái**)(**fàà**) 'give birth').

However, we highlighted that unlike in noun category, iambic foot structure found in verbs is subject to opacity caused by weight variation in the ultimate syllable. While the variation itself is driven by morpho-syntactic, rather than lexical properties characterizing final vowel in Hausa verbs, we proposed – after Newman (1973) –

that this idiosyncrasy is primarily due to radical reduction of morpheme extensions, which have eventually fused into the verb stem.

As such, the reduction is one of many irregular developments found throughout the language's morphology. Two other examples of this phenomenon, namely the aforementioned -**taa** verbalizer, and -**ai** – one of the largest plural classes in the language – are assumed to be driven by general invert size-frequency correlation, thoroughly described in the literature (cf. Zipf 1935; Mańczak 1965, 1969; Kraska-Szlenk 2009), which in Hausa led to suffix allomorphy (-**a.taa** ~ -**taa**; -**aa.ee** ~ -**ai**). Similarly, as shown in (3.4) the reduction in grade-extenstions accompanied by the historical iambic-driven shortening in verb stem, made the verbal structure substantially decreased, and as such – encouraged pluractionals to move reduplication to the prefix. On the other hand, longer verbs still augment in the fashion established earlier.

To sum up, while the reduction in function morphemes has generally made the iambic template bleed, the latter – being well established in the system – constantly preserves the drive to define the morphological categories. Conflict between the two phenomena has produced a range of allomorphy rules, to the joy of linguists and pain of language-learners. As such, iambicity may prove to be a useful tool in explaining Hausa morphology.

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