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A TYPOLOGY OF CI-REDUPLICATION IN NIGER-CONGO AND BEYOND

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DECLARATION

I, Njoya IBIRAHIM, hereby affirm that I have read and understood regulation § 7.4 of the doctoral regulations for the Faculty of Humanities at the University of Hamburg on plagiarism, dated 7 july 2010. I hereby declare that this dissertation entitled “A Typology of CI-reduplication in Niger-Congo and beyond”, written under the scientific supervision of Prof. Dr. Roland Kießling, was single-handedly conceived by me. To the best of my knowledge, it contains no quotation or contribution by another scholar or someone surrounding me that has not been explicitly acknowledged. I also declare that the scientific contribution made by this study is the product of my own work and original research. The thesis in the same or similar form has hitherto not been presented to another examining authority in Germany or abroad, nor has it been published.

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NJOYA IBIRAHIM

ABSTRACT

CI-reduplication [hereafter CIR] is a process widespread in West African languages and it consists of prefixing to a given stem a copy of its onset followed by an underspecified high vowel for grammatical purposes. This dissertation fulfils two main goals. First, it provides a thorough description of CIR formal and functional types, and investigates the correlation between CIR forms and functions cross-linguistically. Second, it revisits previous analyses of CIR, provides support for some claims and suggests ways to ameliorate others towards a unified approach of CIR.

In relation to the first goal, it results from this investigation that CIR spreads over two phyla, Afroasiatic (West Chadic) and Niger-Congo. From a formal perspective, three patterns are identified cross-linguistically depending on the reduplicant [henceforth RED] allomorphy: languages with an invariable RED (CIR Type I); languages with a quasi-variable RED which assimilates roundedness optionally or in a restricted labial environement (CIR Type II); and languages with a variable RED depending on Yes/No the stem vowel is high and its onset grave, palatalized, labio-velarized or not (CIR Type III). Regarding the function, it is shown that CIR is used for marking various categories involving iconical motivation, e.g.: decrease and encrease of quantity or quality, or lacking iconical motivation as it is the case with lexicalization.

Regarding the second goal, it is argued that the analysis that best accounts for CIR as displayed across languages, is one in which CIR is considered as a morphophonological process affixing a prosodic underspecified CV[+high] morpheme. The analysis is essentially data based, and the approach combines typology with new trends in generative grammar (underspecification, feature theory, autosegmental phonology) to account for CIR. Using a purely descriptive approach proves more advantageous. It suggests a way of dealing with very rich and diverse varieties of CIR patterns without having to frame any new theoretical background or postulate any ad hoc rule that fails to apply in certain environments where the same conditions for application are met.

Above all, the present study faces few problems than former accounts of CIR where it is considered a purely phonological process. It has the potential of being generalized. It exploits frameworks already available in the grammar to account for CI-reduplication.

DEDICATION

In memory of my beloved mother Lucie Valerie Apang

1956-2014

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LIST OF ABBREVIATIONS AND SYMBOLS

Tones

[́] / H	High tone	[̀] / L	Low tone
[ᶺ] /ꜜH	Downstepped high	[̏] / EL	Extra low tone
[̌] / LH	Rising tone	[̂] / HL	Falling tone

Segments

(C)	optional consonant	N	homorganic nasal
C	consonant	NC	prenasal
C_1	stem-initial consonant	NCC	prenasalized diphone
C_2	second consonant within a cluster	NCj	palatalized prenasals
CC	consonant cluster	V/ V:	short/long vowel
Cj	palatalized consonant	Ṽ	nasal vowel
CV	set of phonemic melodies	V_1	stem-initial vowel
Cw	labialized consonant	V_2	stem second vowel

Abbreviations

1SG	first person singular	cor	coronal
2SG	second person singular	C_1STEM	stem-initial consonant
3SG	third person singular	DEF	definite determiner
ADJ	adjective	F	feature
ADV	adverb	FOC	focus
ant	anterior	gr	grave
ATR	advanced tongue root	hi	high
bk	back	lab	labial
CIR	CI-reduplication	LGA	local government area
COMP	complementizer	N	noun
cons	consonantal	nas	nasal

cont	constinuant	NMLZ	nominalizer
CONT	continuous aspect marker	OT	Optimality Theory
PL	plural	syll	syllabic
PLUR	pluractional	TETU	the Emergence of the Unmarked
POSS	possessive marker	TM	tense marker
PREP	preposition	TRED	tone borne by the RED
Quant Ref	quantity of referent	TSTEM	tone borne by the stem
rd	round	TV	transitive verb
RED	reduplicant	vd	voiced
RedF	reduplicated form	VRED	reduplicant vowel
REST	restrictive aspect	V_1STEM	stem vowel
RFM	reflexive marker	OBJ	object
s.o.	someone	WBC	West Benue-Congo
SG	singular	WF	word formation
smt.	something		
son	sonorant		
SUB	subordination		

Symbols

-	morpheme boundary	<	derived from
~	alternate with	<…>	optional element
??	frozen stem	α	variable feature coefficient (-/+)
*	ungrammatical	β	variable feature coefficient (-/+)
→	becomes	σ	syllable
| |	morpheme boundary		

INTRODUCTION

0.1 Overview

'REDUPLICATION[1] is encountered in every language and effects all types of linguistic units' (Inkelas & Zoll 2005: 1). It consists of doubling some component of a morphological base – parent material – for some grammatical purposes (Inkelas & Downing 2015, Part 1 & 2). Quite a number of West African languages of varied genealogical affiliation utilize – for inflectional (1) as well as derivational (2) purposes – a certain type of reduplication which has not been found in other areas worldwide so far, i.e. high vowel reduplication or CI-reduplication[2] (henceforth CIR), a type of partial reduplication which repeats the initial consonant of the lexical root as a prefix and inserts a high vowel (Kießling 2012: 6).

(1) Fe'fe' (Hyman 1972: 97): Restrictive/Continuous aspect

RedF	Gloss	Verb	Gloss
zʏ-za	eat only and continuously	< *zʏ*	eat
ti-to	punch only and continuously	< *to*	punch
si-sii	spoil only and continuously	< *sii*	spoil
ku-ku	carve only and continuously	< *ku*	carve

(2) Makaa (Ibirahim 2015: 117f.): Diminutive

RedF	Gloss	Verb	Gloss
***ʃì**-ʃílɔ́*	small girl	< *ʃìlɔ̀*	girl
***dʒù**-dʒǔː*	small thigh	< *dʒùː*	thigh
***fí**-fjáŋ-ú*	small soup	< *fjáŋ*	soup
***mɨ̀**-mɛ́jɛ́*	small sculptor	< *mɛ́jɛ́*	sculptor

[1] Throughout this work, the terms 'stem/simplex', 'reduplicant', and 'reduplicative' will be used to mark the distinction between the different items involved in reduplication. Consider the following Makaa intensified adverb ***làl**-làl* 'very strong/hard' < *làl* 'strong/hard'. I consider the stem or simplex to be the original or parent material (< *làl)*, the RED to be the repeated element or copied unit of the stem/simplex (***làl**)*, and the reduplicative or reduplicated form (RedF) to be the word obtained as the final result of reduplication (***làl**-làl)*. For total reduplication, the RED is bolded in order to avoid confusing it with the stem.

[2] In the literature, CI-reduplication is also referred to as "Reduplikation des ersten Radikal" by Jungraithmayr (1970: 105ff.); "high vowel reduplication" by Hyman 1970, 1972, 1973; "CV[+high] reduplication" or "H-reduplication" by Faraclas & Williamson (1984:1f.); "partial initial high vowel reduplication" by Kießling (2012: 6). For some scholars, referring to the aforementioned process as "H-reduplication", "high vowel reduplication" or "partial initial high vowel reduplication" is misleading because it can also be comprehended or confused with high tone (vowel) reduplication (Mechthild Reh, p.c). In order thus to avoid any confusion, CI-reduplication is adopted for this investigation. The concept CI-reduplication is coined from the C*a*-reduplication type widespread in Austronesian languages (cf. Blust 1998, 1999).

From a formal perspective, regarding (1)-(2), it is observed that while the initial stem-consonant (C_1STEM) is always copied in such a process, the vowel of the reduplicant (VRED) does not represent a full copy of the stem vowel (V_1STEM) itself, but is rather pre-specified as high, adopting height, front/back and roundedness features from the stem to different extents, depending on the individual language.

Working on Bantu languages, particularly those belonging to the Lower Cross group of the Niger-Congo sub-phylum, Faraclas & Williamson 1984 present quite interesting empirical facts drawn from previous works. They note that reduplication is an extremely widespread process in Niger-Congo languages used to achieve various functions such as distribution, plurality, repetition, customary activity, increase of size, added intensity and continuance (Sapir 1921: 76). Faraclas & Williamson 1984 further note that Hyman 1970 describes the vowel of the reduplicant in Nupe as always high, but agreeing in backness and roundedness with the stem vowel (cf. 3.3.1.3); and that Schachter & Fromkin 1968 describe a more complicated situation in Akan, where the copied high vowel is also conditioned by the stem-initial consonant (cf. 3.3.6.3). Reduplication pattern such as in Nupe, where the copied vowel is conditioned exclusively by the stem vowel, is described as CV[high] reduplication. Reduplication pattern such as in Fe'fe' and Akan, where the copied vowel is conditioned simultaneously by the stem onset and vowel, is described as CV[+high, ±grave] reduplication. A third possibility, *Ci* reduplication, is for the reduplicating vowel to be invariably [*i*], as in Yoruba (cf. 3.3.1.1). All three possibilities are subsumed under the term H-reduplication (Faraclas & Williamson 1984: 1f.).

Kießling 2012, in his analysis of CI-reduplication in Isu (a West Ring language), describes a productive type of partial reduplication used mostly in the derivation of intensive adjectives from quality verbs and adjectives. CI-reduplication in Isu share many features in common with the CI-reduplication type widespread in West African languages. In Isu, as in some neighbouring West Ring languages, Zhoa and Weh, CIR consists of prefixing to a root a copy of its first consonant inserting a high central vowel [*ɨ*] which changes to [*u*] in labial environment (Kießling 2012: 6).

(3) Isu (Kießling 2012: 10f.): Intensive verbal adjectives/ Frozen noun

RedF	Gloss	IPF Form	Gloss	Simplex	Gloss
***dî**-díjɛ̀*	very huge	-	be huge	< *dìjɛ̀*	huge
***tî**-tɛ́bə́*	very small	*tɛ́bə́*	be small	< *tɛ́b*	small
***ɣî**-ɣáʔá*	very fat	*ɣáʔá*	be fat	< *ɣáʔ*	fat
***bû**-buí*	very soft	-	-	< *búi*	soft
***zô**-zúmə́*	very dry	*zúmə́*	be dry	< *zúm*	dry
*ká-**vú**-vɔ́ŋɔ́*	soldier ant	-		?? *vɔŋɔ*	

Al-Hassan 1998, in his investigation of reduplication in Chadic languages, describes a type of partial reduplication he labels CV + Base reduplication type (II) (see 4) which looks similar to CI-reduplication except that some REDs occur as C*ə*- (a proof of an on going mutation? A distinct subcategory of CV-reduplication?).

(4) Fyer (Al-Hassan 1998: 65 citing Jungraithmayr 1970): Pluralization

RedF	Gloss	Verb	Gloss
fu-fwâʃ	arrows	< *fwàʃ*	arrow
bì-bén	biceps	< *bèn*	bicep
hi-hjé	stomachs	< *hjé*	stomach
ji-jáán	stones	< *jan*	stone
lí-léém	rivers	< *lem*	river
ɓə-ɓéet	bows	< *ɓeet*	bow
mə-máan	fires	< *maan*	fire

Al-Hassan (1998: 65f.) indicates that several Chadic languages distributed in the West and East present a CV reduplication type within which the the reduplicant vowel is replaced generally by a high vowel that agrees in roundedness with the stem-initial consonant except from cases where the VRED is [*ə*]. Though he recognizes that in few cases the VRED may be predictable, he claims however that its choice is somehow arbitrary because he finds no apparent, motivated phonological or etymological basis in the root justifying the fact the VRED is high.

The preceding brief overview reflects that quite a substantial amount of work has been carried out over the past five decades on the mechanism of CI-reduplication and the manner in which the RED differs from the stem in West African languages. Not much however has been said on the typology of CIR cross-linguistically. Up to date Faraclas & Williamson 1984 – an article

in which eight languages are mentioned, viz: Ninzo, Nupe, Bekwarra, Grebo, Akan, Igbo, Krumen and Fe'fe' (omitted involuntarily by the author) – remains the unique typological attempt to CI-reduplication. In both parameters, i.e. shape (impact of neighboring segments onto the RED underspecified high vowel, tonal alternation) as well as in its semantic function (intensification, nominalization…), CIR shows a considerable degree of cross-linguistic variation. The lack of exhaustive synchronic and diachronic analyses makes it difficult to have a general and clear view of CI-reduplication types cross-linguistically. More so, when one goes throughout these various publications, the different theoretical approaches used by the authors to account for the process of CIR blur the phenomenon and give the impression that these languages share almost nothing in common except the fact the VRED is always high. The present research therefore seeks to fill this gap. It constitutes the first inquiry to deal with CIR formal and functional patterns across languages, and to provide a thorough and unified description of CI-reduplication.

0.2 Goal and significance of the study

The present study addresses the phenomenon of CI-reduplication with the aim to provide an in-depth description of CIR in Central and Western Africa, integrated into a unified framework which is based on a rigid definition of the phenomenon in delimitation from other instances of partial reduplication, and to develop a typological categorization of its formal and functional parameters of variation, plotting their geographical distribution.

This investigation is a continuation of Ibirahim's 2009, and 2013 analyses of high vowel reduplication (HVR) in Makaa. The aim was to provide an exhaustive description of the form and function of HVR in Makaa. It is argued – based on new tenets elaborated within generative grammar – that HVR is better accounted for in Makaa if one assumes, adopting Marantz's 1982 proposal, that it is a normal affixation process where an abstract CV Template is prefixed to a given stem (Ibirahim 2009: 187). The VRED quality depends upon the V_1STEM and/or C_1STEM. (a) It is always [*u*] if the C_1STEM is a labio-velarized consonant or a labio-velar glide, (b) it is [*i*] if the C_1STEM is a palatalized consonant or a palatal glide, (c) it is identical to the V_1STEM if the latter comprises a high vowel, and finally, (d) it is [*ɨ*] if the V_1STEM is non-high and the C_1STEM is none of the four aforementioned cases. As for the prosody, tones are never copied but rather acquired through phonological processes (Ibirahim 2013: 259).

The fundamental objective here goes along the same line. However, the scope of this study has been extended considerably both in terms of languages investigated (29 in total) and in terms of methodological approach. Studying CIR in Makaa sharpened my curiosity and instigated me to wonder, how it displays in other languages and what could be its formal and functional characteristics cross-linguistically.

The distribution of CI-reduplication in the restricted area of Central/West Africa with a hot bed in Nigeria and Cameroon; and the fact that it spreads over two major African language phyla (Niger-Congo, Afroasiatic) probably point to a direction of contact-induced diffusion from Niger-Congo (whereby CIR is more widespread) to Chadic (with limited distribution to some Plateau languages). CI-reduplication is likely a further feature of the contact zone of Benue-Congo and Chadic which could be added to the list of features already assembled by Wolff & Gerhardt 1977 (cf. 4.2.5.3).

Diachronically, the subcategorization of CIR in three types suggests a progressive proliferation of allomorphy and increase of conditioning factors. It will be shown, based on empirical data from Isu for example, that CIR represents an intermediary stage in the reduction of total reduplication along a cline of partial reduplication without underspecified segments towards a full reduction which would entail a loss of the reduplicate C as suggested by Steriade 1988 and Faraclas & Williamson 1984 (cf. 4.2.4.5).

Additionally, this research attempts an answer to questions related to reduplication in general and to CI-reduplication in particular that continue to instigate interesting and striking debates up to date. Among some questions raised are the following:

i. Theoretically, two general approaches to reduplication are possible: phonological vs. morphological doubling (Inkelas & Zoll 2005; Hyman, Inkelas & Sibanda 2005, Kirchner 2010, Alderete & al. 1999). Is CI-reduplication thus a phonological or morphological doubling? Or does it require the application of both mechanism as argued within this work and earlier before by Inkelas & Zoll 2005; Hyman, Inkelas & Sibanda 2005.

ii. To what extend are features of the non-reduplicated form transferred into the new phonological category and how do these transferred features interact with the original features of the receiving category? In other words, how much is copied, where and how does one fit the copied element(s)?

iii. Which word-classes are involved? Which types of meaning are expressed? Are they specific functions fulfilled by CIR or does it achieve the same goals as total reduplication or other affixal derivations?

The preceding questions can be answered only if a thorough description of CI-reduplication cross-linguistically is done. Hopefully, this research will be of interest to those fascinated with studies on reduplication in general and CI-reduplication in particular, to typologists, to Africanists, to Niger-Congo and Chadic specialists.

0.3 Organization of the dissertation

The work is organized in four chapters preceded and followed by an introduction and a conclusion respectively. The introductory section provides a succinct overview of the phenomenon of CI-reduplication, outlines the goal, the relevance and the organization of the study. Chapter one, that is methodology, provides an overview of the research methodologies applied, basic concepts used, the corpus and briefly presents the languages considered in the study.

Chapter two and three constitute the core of the study. Chapter 2 departs from a general definition of reduplication (cf 2.2), a description of its formal and functional types cross-linguistically (cf. 2.3 and 2.4) to a typology of CI-reduplication (cf 2.6-2.8) based on synchronic analyses in Chapter three. Section 2.6 defines CI-reduplication contrasting it with pseudo cases of CI-reduplication as in Lushootseed for example. Section 2.7 outlines cross-linguistic generalizations on CI-reduplication based on three major factors, namely, form, function and areal distribution. Three formal patterns are distinguished: CIR Type I with an unvariable RED, CIR Type II with an almost unvariable RED, and CIR Type III with a variable RED. From a functional perspective, it is shown that CIR is used to mark functions with iconic motivation such as intensification, plurality, diminution, and also for word formation. Regarding the areal distribution, it is shown that CI-reduplication spreads exclusively over Niger-Congo language phylum and the West Chadic branch of the Afroasiatic phylum. Chapter three is devoted to case studies. It substantiates the types developed in Chapter two in detail by presenting 29 case studies organized by their formal types. Chapter 4 entitled ‘The implication of typology to a generalized approach of CIR’ discusses the results pertaining to formal and functional generalizations in a broader perspective (4.2), their diachronic implications regarding the relation of CIR to total

reduplication and the merits of a typological approach to CI-reduplication (4.3), as illustrated by an alternative analysis of CIR in Yoruba (4.4).

The conclusion summarizes the major findings with respect to the various research questions. It poses the problems encountered while accounting for CI-reduplication, and states the implications of such a study for linguistic theory. It also indicates limitations and makes suggestions for further research projects.

The thesis closes with references, two appendices (a list of cited languages and German abstract) followed by subject, language, and author indexes. The thesis is preceded by the obligatory declaration and a one-page abstract in English.

CHAPTER 1: METHODOLOGY

1.1. Introduction

This chapter discusses the research methodologies used in collecting, presenting, analysing and interpreting the data. Like many other works in linguistics, it also highlights crucial details on the target languages.

1.2. Sampling

For a large scale survey, as it is the case with the present study, access to data is of paramount importance. The work is based on thorough reanalyses of data drawn from existing published sources on 29 languages which display CIR, enriched and augmented by a corpus of additional data on the Cameroonian languages Makaa, Fe'fe', Bafut and Isu, collected in extra-fieldwork, in order to advance the documentation and test for crucial typological parameters which could otherwise not be retrieved from the existing documentation of these languages in order to allow for an unequivocal assignment to typological categories according to formal and functional parameters established in the course of comparism.

1.3. Data analysis

In analysing the data, the varieties of reduplication patterns collected were submitted to an intensive study of their internal structure aiming at elucidating what additional elaborations were needed to come out with generalizations on CI-reduplication. In somes cases, the data begged for analysis because it was not done explicitly in the source study. In other cases, the data had to be reanalyzed in order to fit with the approach assumed in this work.

1.4. State of the art

This research is conducted under the guidance of descriptive grammar. It is essentially data oriented and focuses mostly on linguistic typology as in Moravcsik 1978, 2013, Velupillai 2012, Koptjevskaja-Tamm 2011, Bickel 2007 and Comrie 1988; and on underspecification as articulated by Archangeli 1984, 1988, Archangeli & Pulleyblank 1986. However, where

deemed necessary, I refer to autosegmental phonology as articulated by Goldsmith 1990 and Kenstowicz 1994 to handle certain specific issues in a more insightful manner.

1.4.1. Typological approach

According to Velupillai (2012:15), typology, as well as many linguistic terms, is borrowed from the field of biology and means something like "taxonomy" or "classification" (Croft 2003:1), or to be more precise, "the study and interpretation of types" (Stevenson 2010: 1922). By analogy, linguistic typology refers to the study and interpretation of types; it concerns itself with the study of structural differences and similarities between languages. Its main goal is to understand "what's where why?" (Bickel 2007: 248); i.e. carrying out a typological analysis consists of establishing recurring patterns across languages, in order to answer the questions "What is out there?" "Where does it occur?" and "Why do we have particular patterns?"

Carrying this study along the lines of linguistic typology therefore implies that a representative sample of the various patterns of CI-reduplication cross-linguistically have been gathered, described, compared and contrasted in oder to come out with generalizations.

In addition, because typology and language contact share common interests, studying CIR cross-linguistically will permit to apprehend the nature of the internal similarities observed among Niger-Congo languages on the one hand, and between Niger-Congo and Chadic languages on the other hand. In other words, comparing CIR patterns across languages will permit to determine if Yes/No these languages have CIR (a) by shared inheritance, (b) by language contact, (c) by shared environmental conditions, (d) by references to language types (Moravcsik 2013: 8), (e) by accidental coincidence, or (f) by internal development (Gerhardt 2014).

1.4.2 Feature theory

The feature theory adopted within this thesis to account for the phenomenon of CI-reduplication is as developed in Goldsmith 1990, Riggle & Yu 2011, Odden 2005, Pulleyblank 1988, 1986 and 1983, Kiparsky 1982, Hyman 1973 and Chomsky & Halle 1968. The essence of using this framework is fourfold. First, it permits to use phonetic features to define both vowels and consonants determining and differentiating alongside natural classes (cf. 1.4.2.1). Second, it helps in identifying underspecified or non-redundant features from full

specification matrixes (cf. 4.3.2 and 4.4). Third, it permits to categorize and differentiate, on the one hand, classes of sounds that modify the VRED from those that fail to do so; and on the other hand, classes of sounds that are transparent, i.e., sounds allowing feature spreading, from those that are opaque and consequently block features to span (cf. 2.7.1.4.3). Fourth, it helps to formalize rules that capture the various environments where the VRED is subjected or not to variation (cf. chapter 3).

As a point of departure, every single vocalic and consonantal segment is fully specified. Because all features are not necessarily contrastive within a sound system, underspecification is needed to eliminate adequately all redundant features in the underlying representation. A central claim to the underspecification theory is that most redundancy rules are not language-specific rules; they are (a) provided by universal grammar (default rules) or (b) derived by a general principle of universal grammar (complement rules), Pulleyblank (1986: 123). Equally important to the underspecification theory is the ordering of the redundant rules. It is assumed that these rules are assigned as late as possible, unless there is evidence to the contrary. In case a particular rule must refer to a given redundancy feature, the redundancy rule assigning that feature must be assigned as early as possible within the stratum this rule applies (cf. 4.3.2 where the redundancy rule assigning the feature [+high] to a vowel not marked for it has to apply earlier before other redundancy rules in order to satisfy the condition for the phoneme /*u*/ to be copied in Yoruba). This is known as the Redundancy Rule Ordering Constraint (RROC) (Pulleyblank 1986: 126).

1.4.2.1 Phonological features

The set of features used within this thesis is adapted from Chomsky & Halle 1968 exception made from the acoustic feature Grave proposed by Jakobson, Fant & Halle 1952.

Trubetzkoy (1969: 36) defines features as “the sum of the phonologically relevant properties of a sound”. Segments belonging to the same class often function together as a set, either by influencing other sounds, or by being influenced in some environments as shown in chapter 3 via assimilatory rules. No two segments can have the same value of features used in their description though belonging to the same set or class. They differ at least in a feature value. Each feature has two values: a positive value [+F], when the segment is marked for this feature and a negative value [-F], when the segment is not marked for the given feature. The phonological features provided below are limited solely to segments that take active part in

CI-reduplication across languages. Cf. chapter 3 to see how the set of features presented here are used in describing segments and in determining the exact contexts that determine the RED allomorphy. Features are also used in chapter 4, sections 4.3.2 and 4.4 to account for CI-reduplication in Yoruba.

A. Features used in describing consonants only

It is observed across languages under investigation that alveolars, palatals (as opposed to bilabials; labio-dentals; velars, and labio-velars), palatalized consonants, labio-velarized consonants and glides can modify the VRED (cf. 2.7.1.4). The features below are used to distinguish and describe in a distinct manner the aforementioned sets of consonants.

Anterior [±ant]: Anterior sounds are produced with a primary constriction at or in front of the alveolar ridge. In general, labials, dentals, alveolars are anterior, i.e. [+ant] while palato-alveolars, palatals, velars, uvulars and pharyngeals are posterior, i.e. [-ant].

Consonantal [±cons]: The feature [consonantal] is used to describe sounds that are produced with a major obstruction in the oral cavity. Except vowels and glides that are [-cons], all the other consonants are [+cons].

Continuant [±cont]: Sounds that do not have a closure in the oral cavity sufficient to stop airflow through it are described as continuant. Fricatives and liquids are [+cont] while plosives, affricates and nasals are [-cont].

Coronal [±cor]: This feature describes sounds produced with the blade of the tongue raised from its neutral position towards the hard palate (dentals, palato-alveolars and palatals).

Labial [±lab]: This feature is used to describe sounds articulated with the support of the lips. Concerning consonants, this includes bilabials, labio-dentals and labio-velars.

Sonorant [±son]: This feature is used to describe sounds produced with a vocal tract configuration in which spontaneous voicing is possible. Generally, vowels, approximants, liquids and nasals are [+son] whereas obstruents (stops, and fricatives) are [-son].

Voiced [±vd]: This feature is used to distinguish sounds produced with a vibration of the vocal cords from those produced without such a vibration. [p, t, k, s, f, h, x, kp...] are [-vd] whereas [b, d, g, z, v, m, n, l, r, ɓ, ɗ...] are [+vd].

B. Features used in describing vowels only

The following features are used to distinguish and describe vowels across studied languages in a distinct manner.

ATR [±ATR]: This feature describes vowels that are produced by pushing forward the tongue root, expanding the resonating chamber of the pharynx and possibly pushing the tongue body upward. Such vowels are said to be [+ATR], whereas the others are [-ATR].

Back [±bk]: This feature is used to describe all sounds articulated by retracting the tongue body from the reference point. Front vowels are [-bk], and central and back vowels are [+bk]. The motivation for using a two-way[3] distinction [±back] for vowels' places of articulation rather than a three-way distinction, i.e. front vs. central vs. back lies on the fact that no language under study contrasts rounded and unrounded central vs. back vowels. Therefore, there is no need to use the feature [front] to define front vowels as [+front, -back], central vowels as [-front, -back], and back vowels as [-front, +back]. However a problem arises just in the chart in (2) following the two-way contrast adopted in this research. Vowels [ʉ] and [*u*] have the same description. To avoid this problem, for the vowel [ʉ], the positive value for the feature [back] has been marked in brackets, otherwise [ʉ] will have been described as [-front, -back, +round] and [*u*] as [-front, +back, +round].

Syllabic [±syll]: This feature is used to describe sounds that constitute the nucleus or peak of a syllable. In general, vowels and syllabic consonants are [+syll] while non-syllabic consonants are [-syll].

C. Features used in describing both vowels and consonants

The features [grave][4], [high] and [round] are used to define both consonants and vowels.

[3]Another reason à la Odden 2005 that can be given for adhering to a strict binarism even for places of articulation within this work is that the addition of the feature [front], which certainly allows a phonological decription of a class of central vowels, to the universal set of distinctive features has a negative consequence as it defines unattested classes and segments outside of the realm of vowels producing constrast unattested in natural languages. For example, it defines a [-back] natural class of sounds, not possible in the classical theory, comprising front and central vowels (for detail, see Odden 2005:166).

[4] Data from Igbo (cf. 3.3.1.2), Fyam (cf. 3.3.2.4), Obolo (cf. 3.3.4), Ningye (cf. 3.3.2.1) support Hyman's 1973 intuition that the Jakobsonian feature [grave], discarded by Chomsky & Halle 1968, should be reincorporated into universal set of distinctive features used by languages as the aforementioned languages provide empirical facts sufficient enough to sustain the claim according to which labials, velars and back vowels on the one hand, and alveolars, palatals and front vowels on the other hand form distinct natural classes (cf. Chapter 3 for a detailed analysis).

Grave [±gr]: The feature [grave] or acute is part of the distinctive features proposed by Jakobson, Fant & Halle 1952. It is used to define and distinguish sounds produced with a concentration of energy in the lower vs. upper frequencies of the spectrum (Jakobson & Halle 1956 cited by Hyman 1973: 329). Two claims are inherent in this feature distinction. First, labial and velar consonants (as opposed to dentals and palatals) are claimed to constitute a natural class; and second, labial and velar consonants pattern with back vowels, while dentals and palatals pattern with front vowels (Hyman 1973: 329).

High [±hi]: This feature is used to differentiate sounds produced with the body of the tongue raised beyond the neutral position from those produced without such a gesture. The high vowels are said to be [+hi] whereas the mid and low vowels are [-hi]. The feature [high] is also used to distinguish palatalized consonants from non-palatalized consonants.

Nasal [±nas]: Nasal sounds are produced by lowering the velum and allowing air pass outward through the nose. Nasal stops, prenasalized consonants and nasal vowels are [+nas] whereas all other consonants and oral vowels are [-nas].

Round [±rd]: Sounds produced with the lips rounded and/or protruded are [+rd] whereas those produced with the lips in a neutral or spread position are [-rd]. The feature [round] is also used to define consonants with the superimposition of labiality, i.e. labio-velarized consonants (as opposed to non-labio-velarized ones).

Four features out of the fourteen discussed throughout A-C are used in distinguishing places of articulation, namely, the features [grave], [anterior], [labial], and [back]. The feature [grave] used in describing labials, velars and back vowels (as opposed to alveolars, palatals and front vowels) parallels the feature anterior. Features [labial] and [back] are applied both to consonants and vowels. The existence of any of them does not make it possible to discard the others from the general feature theory. These features overlap and each of them plays a role in particular languages depending on their sound systems and phonotactics. In Fe'fe', for example, the feature [±anterior] is needed along side with the feature [±grave] to distinguish alveolars from palatals, whereas in Igbo, Fyam, Obolo, and Ningye the feature grave solely is sufficient to describe contexts governing the VRED variation. In Petit-Diboum, a Fe'fe' lect, the labio-velar glide is reduplicated if only the stem onset is a palatal (alveolar never occur followed by [*w*], Hyman 1972: 106).

1.4.2.2 Matrixes

The present section provides full specification for each consonantal and vocalic segment active in CI-reduplication.

A. Consonants full specification matrix

Below is the full specification matrix of a representative sample of consonants conditioning the reduplicant vowel cross-linguistically.

(1) Consonants full specification matrix

	[**cons**]	[**gr**]	[**ant**]	[**cor**]	[**lab**]	[**hi**]	[**rd**]	[**cont**]	[**son**]	[**nas**]	[**vd**]
p	+	+	+	-	+	-	-	-	-	-	-
b	+	+	+	-	+	-	-	-	-	-	+
m	+	+	+	-	+	-	-	-	+	+	+
f	+	+	+	-	+	-	-	+	-	-	-
t	+	-	+	+	-	-	-	-	-	-	-
d	+	-	+	+	-	-	-	-	-	-	+
ɗ	+	-	+	+	-	-	-	-	-	-	+
n	+	-	+	+	-	-	-	-	+	+	+
l	+	-	+	+	-	-	-	+	+	-	+
r	+	-	+	+	-	-	+	+	+	-	+
s	+	-	+	+	-	-	-	+	-	-	-
z	+	-	+	+	-	-	-	+	-	-	+
ʧ	+	-	-	+	-	+	-	-	-	-	-
ʤ	+	-	-	+	-	+	-	-	-	-	+
ɲ	+	-	-	+	-	+	-	-	+	+	+
j	-	-	-	+	-	+	-	+	+	-	+
k	+	+	-	-	-	+	-	-	-	-	-
g	+	+	-	-	-	+	-	-	-	-	+
ɣ	+	+	-	-	-	+	-	-	-	-	+
kp	+	+	-	-	+	-	-	-	-	-	-
gb	+	+	-	-	+	-	-	-	-	-	+
w	-	+	-	-	+	+	+	+	+	-	+
Cw	+	+	-	-	+	+	+	-	-	-	±
Cj	+	-	-	+	-	+	-	-	-	-	±

B. Vowels full specification matrix

The chart in (2) provides a full specification matrix of each single short and oral vowel attested in the sample languages. Long and nasal vowels are left out because the former are always shortened in the process of CI-reduplication and the latter behave the same as their oral counterparts.

(2) Vowel full specification matrix

	[**syll**]	[**grave**]	[**high**]	[**back**]	[**round**]	[**ATR**]
i	+	-	+	-	-	+
ɪ	+	-	+	-	-	-
e	+	-	-	-	-	+
ɛ	+	-	-	-	-	-
œ	+	-	-	-	+	-
ɨ	+	+	+	+	-	+
ʉ	+	+	+	(+)	+	+
ə	+	+	-	+	-	-
a	+	-	-	+	-	-
ɯ	+	+	+	+	-	+
u	+	+	+	+	+	+
ʊ	+	+	+	+	+	-
ɤ	+	+	-	+	-	+
o	+	+	-	+	+	+
ʌ	+	+	-	+	-	-
ɔ	+	+	-	+	+	-

Given the theory of underspecification assumed within this work, it is impossible to posit the representations in (1-2) as the underlying representations, since they contain considerable redundancy. In each case study (cf. Chapter 3), sound descriptions are restricted to the relevant distinctive features, and redundant specifications simply left out in the underspecifications matrixes as they are added later in the derivations via complement and default rules.

1.5. Presentation of the data and transcriptional notations

The discussion of CIR within this dissertation revolves around massive illustration drawn from different sources. The data presented are as faithful as they appear in the source studies, and every effort has been made to provide exhaustive exemplifications as possible of the various patterns though not without difficulties encountered. Some data from primary sources are not representative enough. In Oko (cf. 3.3.1.4, example ($29_{(i)}$)), Atoyebi 2010, examples with the phoneme /ɔ/ are missing among [-ATR] verb stems. In Krumen (cf. 3.3.7, example (110)), Marchese 1979, no example is given with the back rounded vowel [o]. In Anyin (3.3.6.1, example (89)), Attié (3.3.6.2, example (94)), and in Kulango (cf. 3.3.8, example (114)), Bogny 2005, the function(s) expressed by the reduplicated forms are missing. Note that though the aforementioned omissions would have enhanced visualization and the degree of explicitness, their absence still does not weaken or blemish the conceptual foundation of the analysis nor the degree of reflection on the formal and functional patterns.

To ease typographical reproduction and facilitate reading, some sources' orthographical principles were changed to IPA for a unified way of presenting the data. Diacritic and suprasegmental signs were left out in cases where the authors ommitted them or recognized that they had problems in transcribing them. An attempt has been made each time to translate examples from the original source languages (German, French) into English.

1.6. The languages

In typology, genealogical affiliation[5] and geographical location of languages are both very important factors to know about. This section briefly presents the major languages on which this study is based. There are 29 languages with CI-reduplication found so far: 02 West Chadic and 27 Niger-Congo languages. Language names and number of speakers given here are based on Lewis, Simons & Fennig 2018 (i.e. online Ethnologue) and information about these languages linguistic classification, geographic location on Williamson & Blench 2000, and Hayward 2000. The sample of languages studied within this work are mainly spoken in Cameroon, Ghana, Côte d'Ivoire, Nigeria, and Benin (cf. 2.7.4 for more detail). In the genealogical trees in Figures 1.1-1.6, target languages' affiliations are mark in bold.

[5]See Appendix I for a complete and detailed list of all languages cited within this study.

1.6.1 Afroasiatic languages with CIR

To date, the most neutral reckoning splits the Afroasiatic language phylum into 6 families: Chadic, Berber, Egyptian, Semitic, Cushitic and Omotic (Hayward 2000: 74). CI-reduplication has been attested so far in one of the 04 branches that counts the Chadic branch of the Afroasiatic language family, namely in West Chadic, in Ron languages [Fyer, Daffo, Bokkos and Kulere] and Mwaghavul (see Fig.1.1). Ron and Mwaghavul languages are spoken in Plateau State in Nigeria. No case of CIR was signaled in Berber, Egyptian, Semitic, Cushitic, Omotic, or in the three other Chadic sub-branches, Biu-Mandara, Masa and East. A probable reason justifying the non-attestation of CIR in East, Biu-Mandara and Masa Chadic branches might be the fact that in languages comprising these branches, the functions[6] assumed by CIR are fulfilled by total reduplication, partial (CV/C*a*/C*ə*) reduplication or by -*a*-infixation (cf. Wolff 2008).

1.6.2 Niger-Congo languages with CIR

Niger-Congo phylum is the most largest language family in the world with an estimation of 1545 languages. Many of these languages are still undescribed and others threatened of extinction (Lewis, Simons, & Fennig 2018). It counts 7 sub-families: Kordofanian, Mande, Atlantic, Ijoid, Dogon, North Volta-Congo and South Volta-Congo; and 3 unclassified languages Bèrè, Mpre and Laal (Williamson & Blench 2000: 36). So far, CI-reduplication has been attested in 02 of the three branches that counts North Volta-Congo (Fig. 1.2), i.e in Kru (Krumen, Tépo) and Gur (Kulango, Bouna) (exception made from Adamawa-Ubangui). CIR is also attested in Kwa (Anyin, Abidji, Attié, Akan and Fon) (Fig. 1.3) and Benue-Congo sub-branches of South Volta-Conga. Within Benue-Congo, CIR is found in West Benue-Congo (Yoruba, Emai, Arigidi, Igbo, Nupe and Oko) (Fig. 1.4), in East Benue-Congo (Ningye, Ninzo, Hyam, Fyam, Tarok, Kutep, Beezen and Obolo) (Fig. 1.5) and in Bantoid (Vengo, Isu, Zhoa, Fe'fe', Bafut and Makaa) (Fig. 1.6). The might be possibility to find more Niger-Congo languages with CIR when further languages will be well-documented.

[6]cf. Al-Hassan (1998: 161-211), Wolff 2008 for more detail.

Figure 1.1. Chadic languages with CIR

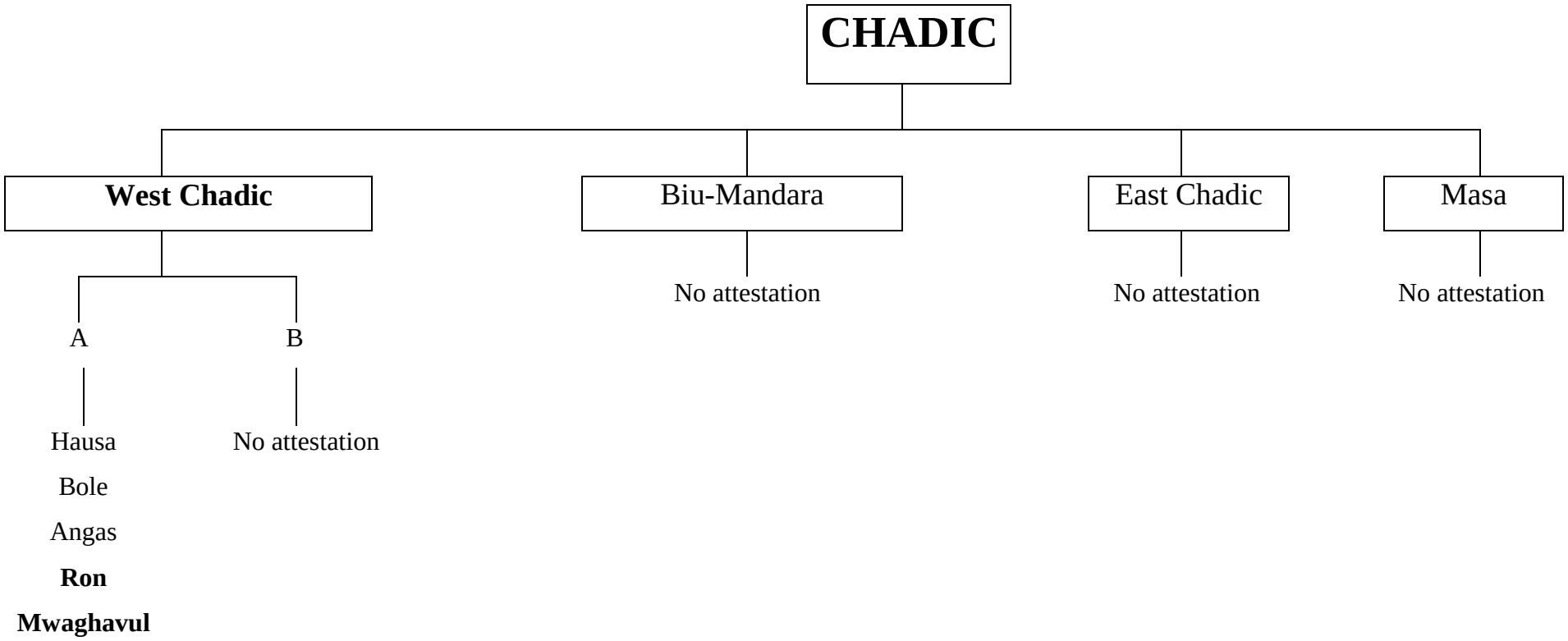


Figure 1.2. North Volta-Congo languages with CIR

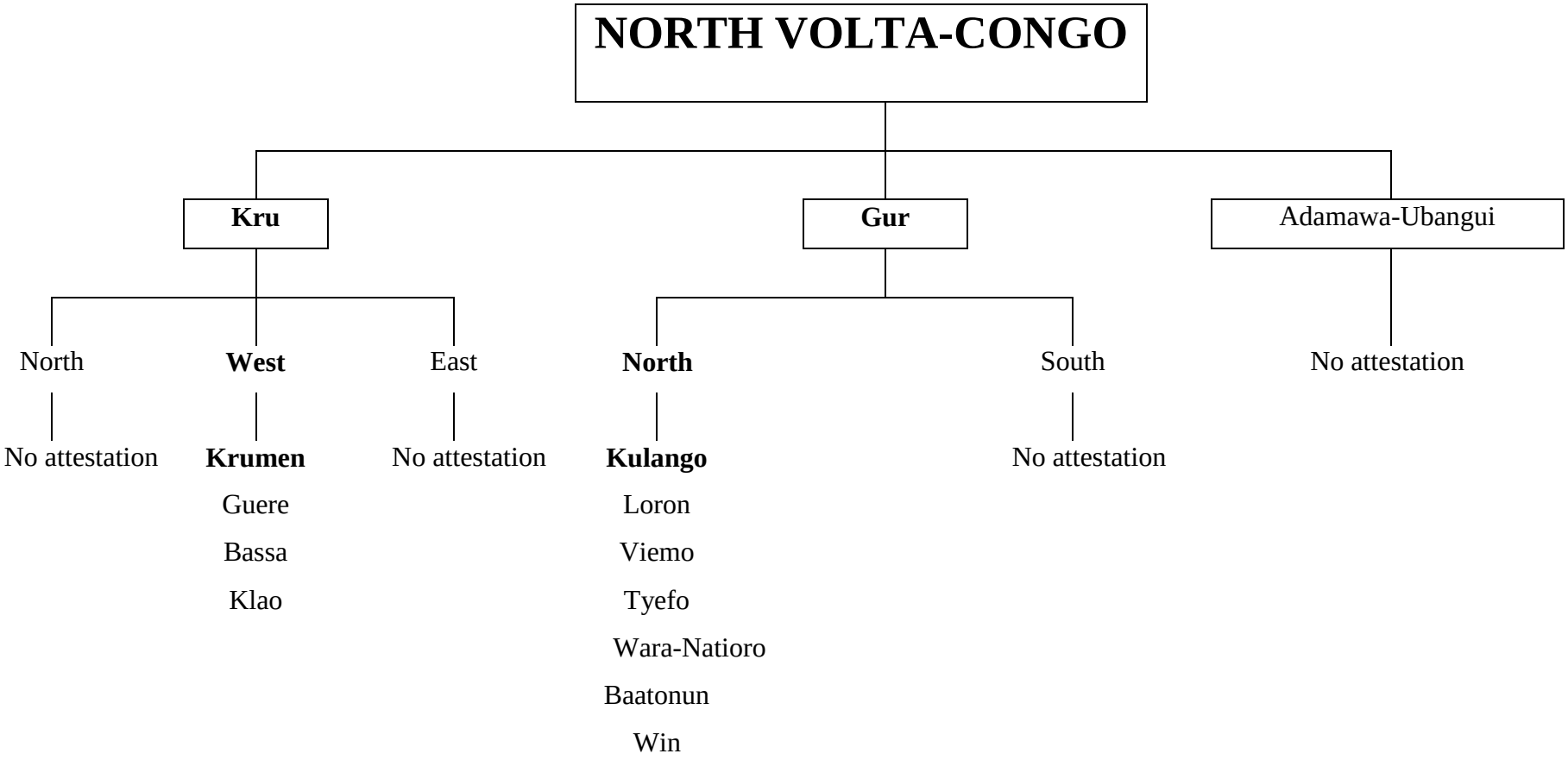


Figure 1.3. Kwa languages with CIR

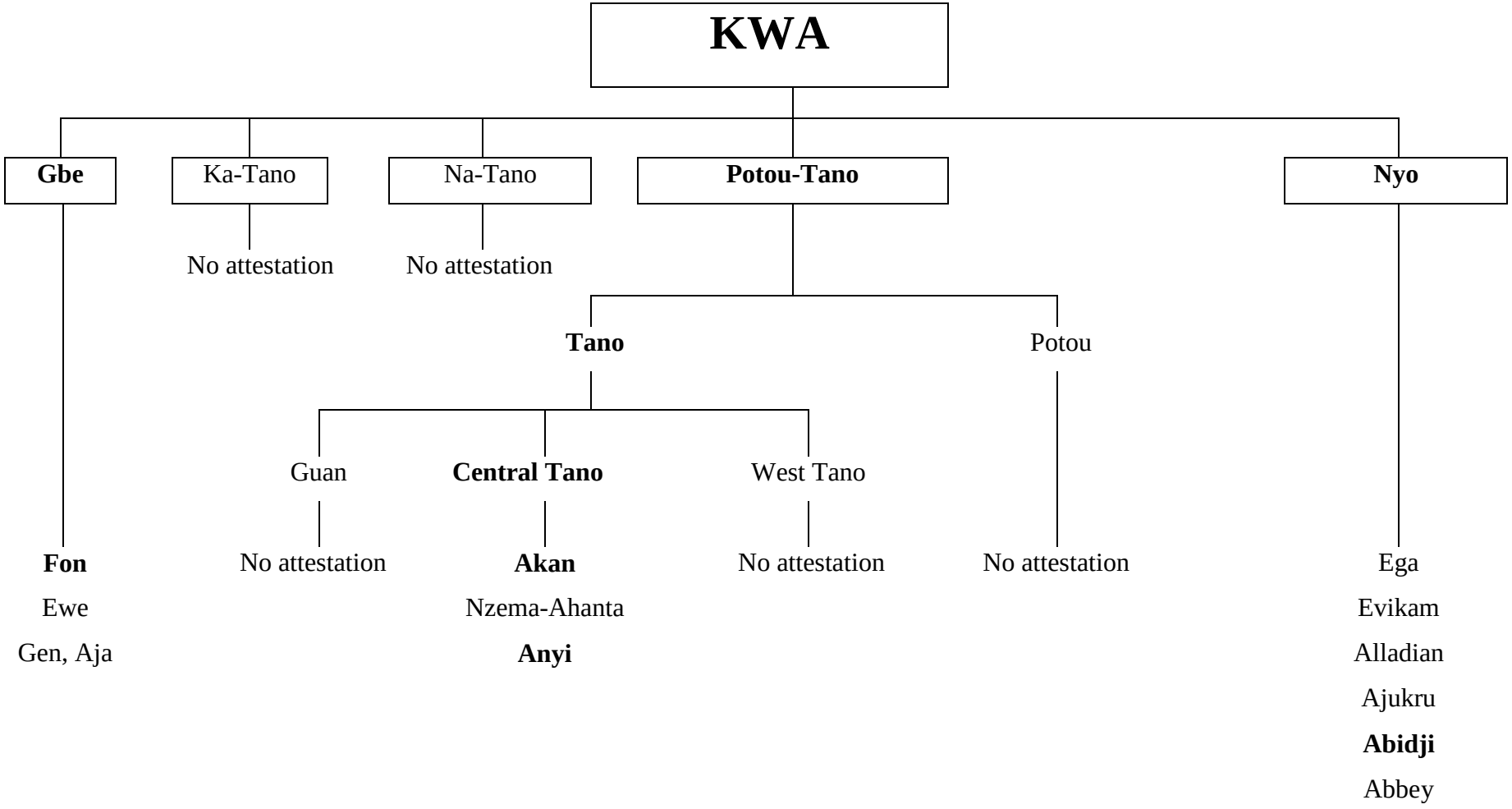
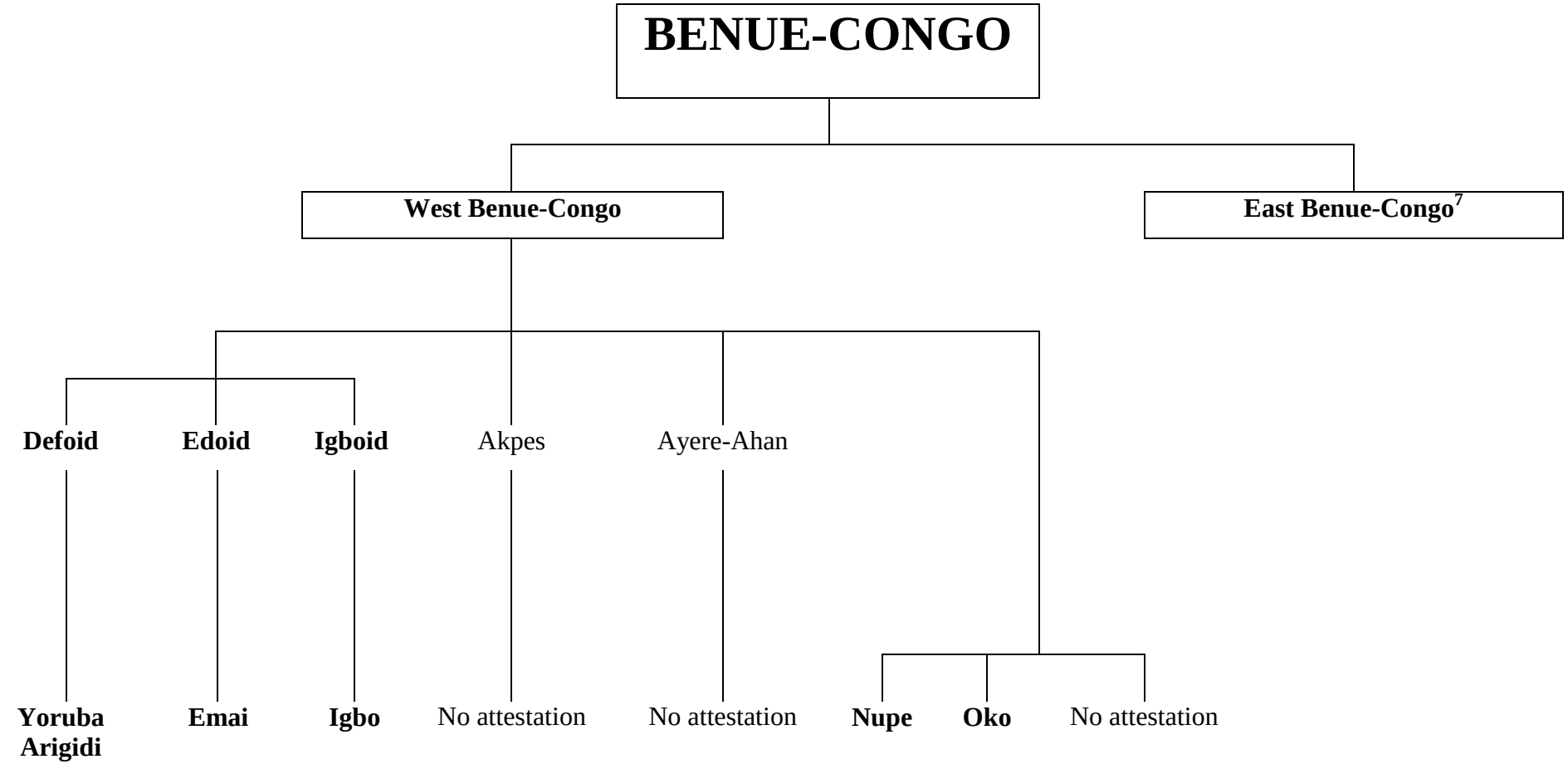


Figure 1.4. Benue-Congo, West languages with CIR



[7]See Fig. 1.5-1.6

Figure 1.5. East Benue-Congo languages with CIR

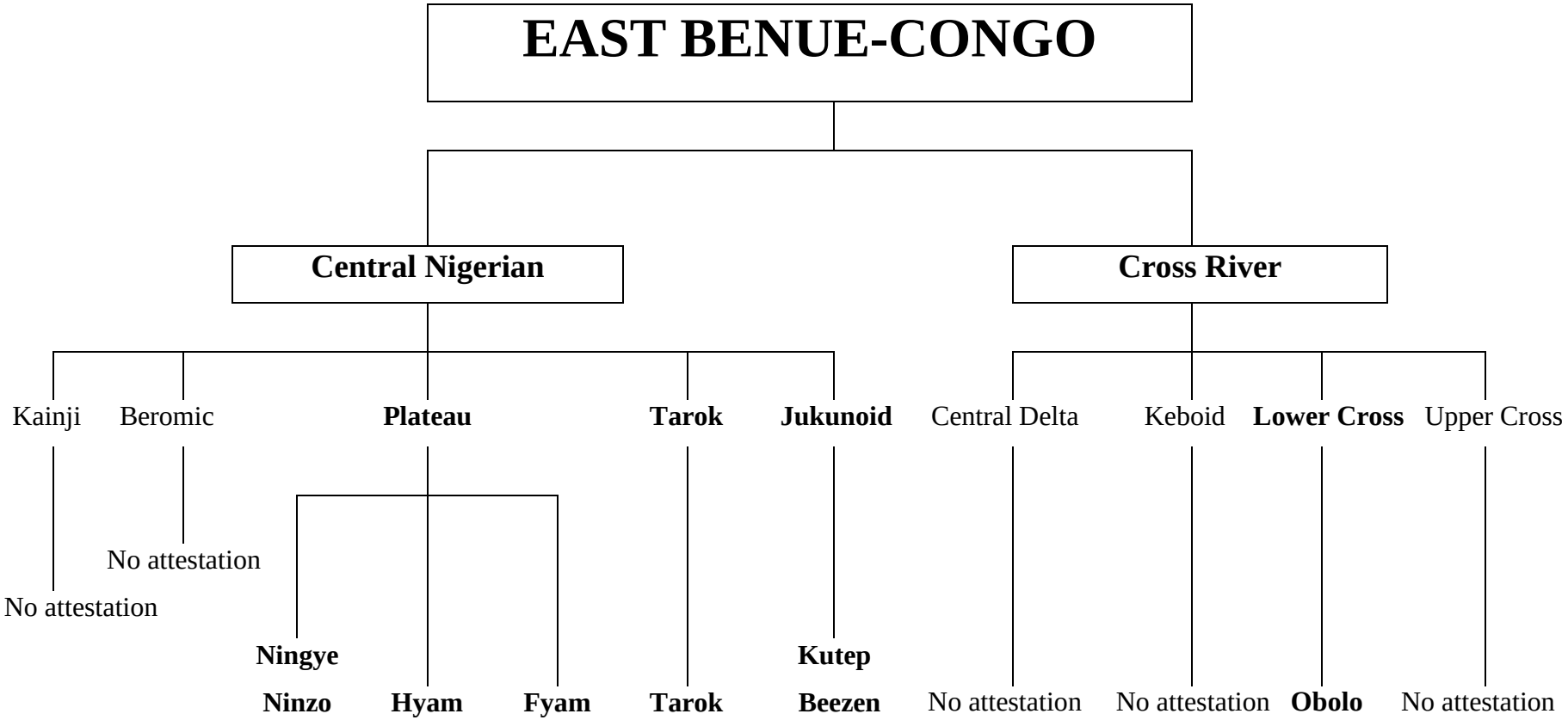
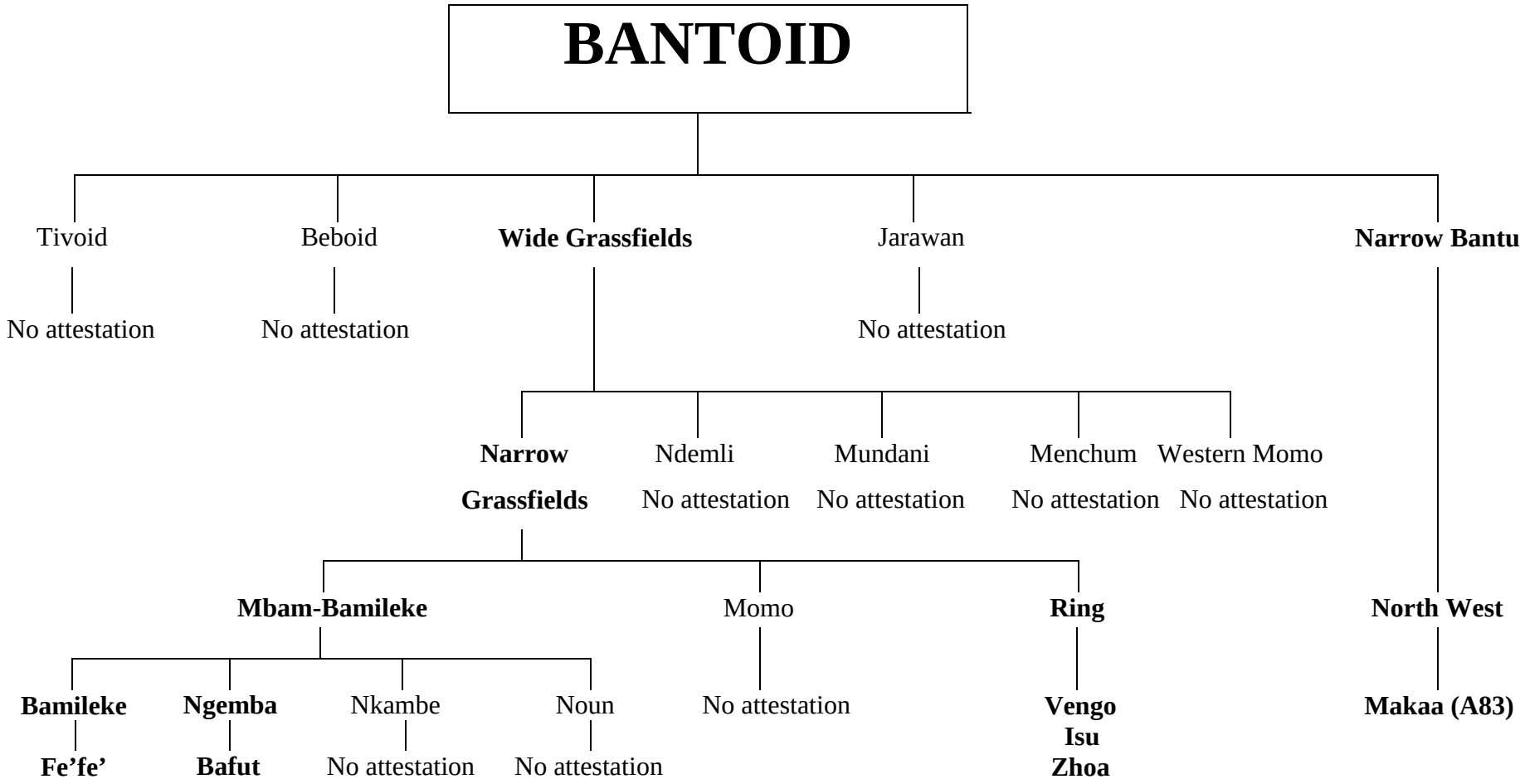


Figure 1.6. Bantoid languages with CIR



1.7. Conclusion

This chapter aimed at providing background information on the research methodologies and how they are used in collecting, processing, and interpreting the data. It also provides details on the target languages, and the way tones and segments are represented, marked, and transcribed althrough this dissertation.

CHAPTER 2: FROM REDUPLICATION TO CI-REDUPLICATION

2.1 Introduction

The present chapter delineates the phenomenon of CI-reduplication (2.6) against the backdrop of basic concepts such as total and partial reduplication (2.2-2.5). Crucial parameters of variation of CIR across all test languages (2.7) are identified, exemplified accurately, and translated into a grid of typological categories based on formal (2.7.1) as well as functional (2.7.2) criteria with an attempt to identify correlations of forms and functions of CIR cross-linguistically (2.7.3), plotting their geographical distribution (2.7.4).

2.2 Reduplication: a definition

Reduplication is a type of word formation – in the broad sense, including both derivation and inflection – in which the phonological form of the reduplicant is determined in whole or in party by the phonological form of the base to wish it adjoins (Wiltshire & Marantz 2000: 557).

2.3. Type and function

From a purely formal perspective, two major types of reduplication are distinguished cross-linguistically: total (1a, 2a) vs. partial (1b, 2b) reduplication. Many languages around the world display both patterns; and use them in inflections (1) to mark functions such as "distribution, plurality, repetition, customary activity, increase of size, added intensity, continuance" (Sapir 1921:79), and/or in lexical derivations to obtain new lexemes (2). In Gwandara for example, adjectives are obtained by prefixation or suffixation of the initial or final (-)CV(-) segments of the stem.

(1) a. Tikar (Stanley 1991: 389f.): Verbs and adjectives intensification

RedF	Gloss	Simplex	Gloss
kimmi-*kimmi*	very strong	< *kimmi*	strong
mbjimmi-*mbyimmi*	very fast	< *mbjimmi*	fast
kwɛn-*kwɛn*	often sick	< *kwɛn*	sick
ndan-*ndan*	often dangling	< *ndan*	dangling

b. Ilokano (Hayes & Abad 1989: 357): Noun plural and progressive form

RedF	Gloss	Simplex	Gloss
kal-kaldíŋ	goats	< *kaldíŋ*	goat
pus-púsá	cats	< *púsa*	cat
ʔag-saŋ-sáŋit	is crying	< *sáŋit*	cry
ʔag-trab-trábaho	is working	< *trábaho*	work

(2) a. Ewe (Ameka 1999: 80): Deverbal nouns

RedF	Gloss	verb	Gloss
***sì**-sí*	escaping, escape	< *sí*	escape
***dà**-dà*	pride	< *dà*	be proud
***sùbɔ̀**-súbɔ́*	worshipping	< *súbɔ́*	worship
***ɖòlì**-ɖòlì*	changing	< *ɖòlì*	change

b. Gwandara (Al-Hassan 1998:199): Adjectives

RedF	Gloss	Verb	Gloss
ʧú-ʧúpá	old	< *ʧúpá*	become old
jùkú-kú	wet	< *jùkú*	get wet

2.4. Shape and distribution

Unlike total reduplication where the entire base is copied (1a, 2a), partial reduplication copies only a portion of the stem (1b, 2b). The shape of the partially reduplicated portion of the stem is not always constant as illustrated in (1b) CVC or (2b) CV. It varies across languages with regard to the number of segments or prosodic units that are copied. The RED can be equivalent to a single phoneme C (3), V (4); to a set of phonemes CC, CV, VC, be it a prosodic unit or not (3-7); a syllable (6); or a set of syllables (8).

2.4.1. C-reduplication

In Daffo [RON], the verb stem-initial consonant is reduplicated and prefixed to it to mark events in progress.

(3) Daffo [RON] (Jungraithmayr 1970: 195): Progressive aspect

RedF	Gloss	Verb	Gloss
ɓ-bìm	swimming	< *bîm*	swim
ǹ-nìn	becoming	< *nîn*	become

2.4.2. V-reduplication

In Emai, persistive aspect is marked by the prefixation of a (C)V- RED[8] to the stem of a given verb. The VRED is always realized as [*i*]. If the verb root begins in a consonant, the RED is C*i*-; and if the stem holds in a vowel, the RED is simply *i*-.

(4) Emai (Egbokhare 1990 cited by Ola-Orie1997: 80): Persistive aspect

RedF	Gloss	Verb	Gloss
í-è	still eat	< *è*	eat
í-ɔ̃	still drink	< *ɔ̃*	drink
í-ù	still die	< *ù*	die
tí-tà	still say	< *tà*	say
gbí-gbè	still beat	< *gbè*	beat

2.4.3. CC-reduplication

Kirchner (2010: 11) reports an unusual case of reduplication in Semai (5) where nouns describing the appearance of X are derived by prefixing a "semisyllable whose segments correspond to the first and last segments of the stem" to the given stem. Though the copied segments do not match any conventional prosodic unit attested in natural languages, Kirchner thinks there is sufficient and good evidence–confined in Diffloth 1976*a-b*; Gafos 1996; Sloan 1988; Shaw 1993; Hendricks 2001; Nuger 2006 and more generally in Cho & King 1999; Kiparsky 2003 – to sustain the argument "that these reduplicants are actually minor syllables, that is, syllables lacking a nucleus" (Kirchner ibid.: 11).

(5) Semai (Kirchner 2010: 11): Qualifying nouns

RedF	Gloss	Simplex
th-taʔəh	appearance of large stomach constantly bulging out	< *taʔəh*
rɲ-ruhɔːɲ	appearance of teeth attacked by decay	< *ruhɔːɲ*
kc-hmrʔɛːc	short, fat arms	< *hmrʔɛːc*
gp-ghɯːp	irritation on skin (from bamboo hair)	< *ghɯːp*

[8]This analysis contrasts with that of Ola-orie 1997 who considers the phenomenon illustrated in (4) as a normal prefixation process rather than CI-reduplication. She claims that with both stems, the prefix *i-* is affixed to the stem; with consonant-initial stem the affix copies the stem onset. There are reasons to think that the process described by Ola-Orie (1997: 80) is related to CIR. See Chapter 3, section 3.3.1.1 for detail.

2.4.4. CV-reduplication

Yoruba and Samoan use CV reduplication in inflection to mark intensification and verb plurality respectively. In Yoruba (6a), the RED is suffixed to the base whereas in Samoan (6b) it is infixed. The copied CV sequences in (6) correspond to a prosodic unit (a CV syllable) unlike in (7-8) where the RED is just a sequence of a vowel and a consonant.

(6) a. Yoruba (Awoyale 1989: 26): Verb intensification

RedF	Gloss	Ideophonic stem	Gloss
konko-ko	being very blunt	< *konko*	be blunt
fárágádá-dá	being totally wiped off	< *fárágádá*	be wiped off
hàràgbàdù-dù	very stout and bulky	< *hàràgbàdù*	stout and bulky

b. Samoan (Broselow & McCarthy 1983: 30): Verb plurality

RedF	Verb	Gloss
a-lo-lofa	< *alofa*	love
sa-va-vali	< *savali*	walk
ma-li-liu	< *maliu*	die

2.4.5. VC-reduplication

In Sha, noun stem-final CV segments are reduplicated and suffixed to a given stem to mark plurality.

(7) Sha (Al-Hassan 1998: 73/173): Noun plurality

RedF	Gloss	Noun	Gloss
ʔawez-êz	drums	< *ʔawez*	drum
ʔakwéʃ-éʃ	buttocks	< *ʔakwéʃ*	buttock
bokol-ól	vaginas	< *bòkòl*	vagina
ɓólóŋ-ôŋ	penis	< *ɓólóŋ*	penis

2.4.6 CVCV-reduplication

Downing 1994, 1997, 2006 describes the RED of reduplicated verbs expressing frequentative (here and there, now and again) in Swati as disyllabic, irrespective of the stem length.

(8) Swati (Downing 2006: 3): Frequentative

RedF	Verb	Gloss
-tfútsa-tfuːtsa	< *-tfúːtsa*	move house
-bóna-bóːna	< *-bóna*	see
-khulu-khulumísaːna	< *-khulumísaːna*	talk to each other
-tfutse-tfutséːla	< *-tfutséːla*	move for

2.5. Prespecified reduplication

The preceding section showed that two major reduplication patterns contrast across languages: total/full vs. partial reduplication. The RED was described as a faithful (exact) total or partial copy of the base stem. Now, consider the RED shape and the nature of segments it comprises in (9) in contrast with the examples in (1)-(8). The reduplicatives in (9a) mean 'X or something looking like X' and/or 'any old kind of X'.

(9) a. Tuvan (Harisson & Raimy 2004:10): Qualifying nouns

RedF	Simplex	Gloss
nom-nam	< *nom*	book
er-ar	< *er*	male
ög-ag	< *ög*	yurt
at-ut	< *at*	name
aːr-uːr	< *aːr*	heavy

b. Tuvan (Kirchner 2010: 86): Intensification

RedF	Gloss	Simplex	Gloss
qap-qara	very black	< *qara*	black
qɨp-qɨzɨl	very red	< *qɨzɨl*	red
up-uzun	very long	< *uzun*	long
bop-borbaq	completely spherical	< *borbaq*	spherical
sap-saybas	will definitely not milk	< *saybas*	will not milk

c. Makaa (Ibirahim 2013: 278f.): Diminutives

RedF	Gloss	Noun	Gloss
ʃì-ʃílə́	small girl	< *ʃìlə̀*	girl
lɨ̀-lɛ́ŋá	small container	< *lɛ̀ŋà*	container
*mbɨ́-*mbɛ́	small door	< mbɛ̂	door

fɪ́-fɪ́ŋ-ú	small wound	< fɪ́ŋ	wound
kɪ́-kə́l-ú	small voice	< kə́l	voice
dɪ́-dá:gə́	small crab	< dá:gə́	crab
*ʤ*ù-*ʤ*ŭ:	small thight	< *ʤ*ù:	thight
zɪ́-zò:lú	small pangolin	< zò:lú	pangolin

A keen look at (9) in contrast with (1-9) reveals, as highlighted by Wiltshire & Marantz (2000: 558), that, though the segmental form of the RED depends on a base, cases exist where the REDs impose phonological requirements on their own, so that they may not reflect all of the characteristics of the base. Through (1)-(8), the RED is either an exact copy of the stem (1a), or a part of it (1b)-(8); whereas in (9), it presents some differences. The VRED in (9a/c) and the RED coda in (9b) are not always identical to their equivalent segment within the stem.

The Tuvan examples (9a) are cases of total reduplication with prespecification[9] of the vowel [*a*] as the VRED. However, In the two last examples, the vowel [*a*] due to dissimilation turns to [*u*] when the stem vowel is of similar quality (Harrison & Raimy 2004:10). On the other hand, (9b) presents cases of partial reduplication with a fixed consonant, [*p*], as the coda of the C_0Vp RED.

The Makaa examples in (9c) are cases of partial reduplication with prespecification of the feature [+high], the type known as high vowel reduplication, widespread in West African languages, which "involves the reduplication of the initial consonant [of a given stem] and inserts an underspecified high vowel" (Kießling 2012: 6). The RED in (9c) is identical to the stem-initial CV (though lengthening is not transferred) if the latter comprises a high vowel; and C*ɪ*-, if it comprises a non-high vowel.

Tuvan (9a/b) represents languages where the RED is an exact copy of the stem, or a partial copy of it with a fixed segment that remains solely unchanged. Makaa (9c) represents a considerable number of Niger-Congo and some few West Chadic languages where the RED is overruled by a phonological constraint which conditions it to always contain a high vowel (cf. 2.6 and thereafter for more detail). The study of the sub-category of partial reduplication with prespecification illustrated in (9c) is the main focus of the present investigation.

[9] Prespecified reduplication is also referred to in the literature as reduplication with fixed segmentism or fixed-size reduplication (cf. Reiss & Simpson 2009, Urbanczyk 2001, Alderete et al. 1999, Chinwei 2009, Marantz 1982, Yip 1982, Clark 1990).

2.6. CI-reduplication: Definition

CI-reduplication is a grammatical process which consists of prefixing to a given stem a copy of its onset followed by a high vowel irrespective of the V_1STEM height. CI-reduplication is used for derivational (10a) and inflectional (10b) purposes.

(10) a. Ondo Yoruba (Ola-Orie 1997: 71): Action nouns

Consonant-initial stems

RedF	Gloss	Verb	Gloss
lí-lɔ̄	going	< lɔ̄	go
ʤí-ʤɛ̄	eating	< ʤɛ̄	eat

Vowel-initial stems

í-ɛ̀˜	walking	< ɛ̀˜	walk
í-ɛ́ʤɛ̄	cheating	< ɛ́ʤɛ̄	cheating

b. Emai (Egbokhare 1990 cited by Ola-Orie1997: 80): Persistive aspect

Consonant-initial stems

RedF	Gloss	Verb	Gloss
tí-tà	still say	< tà	say
gbí-gbè	still beat	< gbè	beat

Vowel-initial stems

í-è	still eat	< è	eat
í-ɔ̃˜	still drink	< ɔ̃˜	drink

It should be noted that what is referred to as CI should not be viewed as a string of two slots, a C(onsonant) and a V(owel), but rather as a prosodic unit, a syllable. Generally, initial-vowel stems do not undergo CI-reduplication. However, in Ondo Yoruba (10a) and Emai (10b), when the stem holds in a vowel, the RED is an onsetless syllable whose nucleus is solely [*i*]. Examples from Ondo Yoruba and Emai strongly empower the claim according to which CIR targets a prosodic unit rather than a sequence of a consonant and a vowel.

2.6.1. What CI-reduplication IS NOT

There are cases of pseudo-CIR as in Lushootseed reduplication (11) that ought to be differentiated from real cases of CI-reduplication as in Igbo (12), since the height of the VRED is not the result of prespecification, but rather caused by phonotactic constraints.

Fixed segmentism, in Optimality Theory (OT), can be subdivided into two distinct types, namely, phonological vs. morphological fixed segmentism (Alderete et al. 1999). Morphological fixed segmentism refers to a kind of affixation process similar to affixing morphology in general, meanwhile phonological fixed segmentism falls under the OT rubric of The Emergence of the Unmarked (TETU) as framed by McCarthy & Prince 1994 (Alderete et al. (1999: 327)). Alderete et al. 1999 consider both Lushootseed (11) and Igbo (12) reduplication to fall under phonological fixed segmentism; and the occurrence of default vowel [*i*] within the RED as TETU favoured by the non-copying of materials from the base. Examples in (12a), where the VRED is identical to the stem vowel, are considered as resulting from an accidental resemblance between the default VRED and the V_1STEM (Alderete et al. (1999:339)).

Urbanczyk (2001: 132), citing Bates 1986, considers the diminutive morpheme in Lushootseed to be CV[10] in shape. It is observed that the RED in Lushootseed diminutives is C*i*- if the root contains a schwa, a long vowel, or begins with a cluster of consonants (11b); and CV- elsewhere (11a).

(11) Lushootseed (Alderete et al. 1999: 340): Diminutives

a. C*i* Reduplication

With C*ə*$C_0V_0C_0$ roots

RedF	Gloss	Simplex	Gloss
tí-təlaw'-il	jog	< təláw'-il	run
gʷí-gʷədil	sit down	< gʷədíl	sit down

[10] The glottal consonant appearing between the RED and the root in some cases in (11) is claimed to result from the application of a postlexical rule (Bates 1986, Frampton 2009). For a careful and detailed discussion of all the processes involved in the choice of CV vs. C*i* please see Hess 1977, 1993, 1995, Hess & Hilbert 1978, Bates 1986, Inkelas 2005, Frampton 2009 and Urbanczyk 1996, 2001.

With CV:$C_0V_0C_0$ roots

s-dí-duːkʷ	small knife	< *s*-duːkʷ	knife
lí-ʔ-luːd	hear something a little	< luːd	hear smt.

With CCV_0C_0 roots

č'í-č'χ'aʔ	little rock	< č'χ'áʔ	rock
c'í-c'kʷ'usəd	little walking stick	< c'kʷ'usəd	walking stick

b. CV Reduplication

RedF	Gloss	Simplex	Gloss
čá-čáləs	little hand	< čáləs	hand
s-dú-ʔ-dukʷ	riffraff	< s-dúkʷ	bad

Now, take a look at the quality and the variation of the VRED in Igbo data in (12) in comparison with what is displayed in (11). Three major observation can be made with regard to (12). First, the VRED in Igbo is always high unlike the stem vowel. Second, when the stem comprises a high vowel (12a), its vowel is copied exactly without change. Third, in the case the base vowel is non-high, it is not copied in the RED, but a high vowel is inserted (12b/c). The inserted vowel is specified for backness and roundedness as determined by a hierarchy of the emergent phonological processes: attraction to a labial or palatal consonant, and otherwise roundedness [and ATR] harmonies (Alderete et al. (1999: 342)).

(12) Igbo (Alderete et al. 1999: 342): Action and stative nouns

a. A high vowel is copied exactly

RedF	Gloss	Verb	Gloss
ti-ti	cracking	< ti	crack
mɪ-mɪ	drying	< mɪ	dry
nu-nu	pushing	< nu	push
ʤu-ʤu	being full	< ʤu	be full

b. Otherwise, labial/palatal attraction

ʧɪ-ʧɔ	seeking	< ʧɔ	seek
nʲi-nʲo	shadowing	< nʲo	shadow
bu-be	cutting	< be	cut
gbu-gbe	crawling	< gbe	crawl

c. Otherwise, roundedness + ATR harmonies

ki-ke	sharing	< ke	share
nɪ-na	sowing	< na	sow
kʊ-kɔ	telling	< kɔ	tell
nu-no	swallowing	< no	swallow

2.6.2. What CI-reduplication IS

The conception of CI-reduplication as perceived and elaborated within this dissertation differs from that of Alderete et al. 1999 in the three following major points.

First, partial reduplication in Lushootseed, in contrast with Igbo, is considered a pseudo-CIR because at the origin, the underlying form of the diminutive morpheme is CV-; C*i*- surfacing just as an alternative variant, i.e an allomorph conditioned by the phonotactic rules described in 2.6.1. Fitzpatrick & Nevins 2003 cited by Raimy (2011: 3868) show that the fixed [*i*] in Lushootseed REDs results from general considerations of the metrical system and has nothing to do with reduplication per se.

As for Igbo, the VRED is always high (irrespective of the V_1STEM quality) harmonizing with the V_1STEM for the [ATR] feature. The choice of the proper allomorph is predictable with respect to the quality of the V_1STEM and/or the C_1STEM. If the stem comprises a high vowel (12a), this vowel is copied without any change. However, if the V_1STEM is non-high, two possibilities show up. First, if the C_1STEM is a labial or palatal sound (12b), the VRED is [*i*] and [*u*] respectively. Second, if the C_1STEM is neither a labial nor a palatal segment (11c), the VRED is [*I*] by default agreeing in roundedness and ATR features with the V_1STEM. Thus, The RED is C*i*-/C*ɪ*- if the V_1STEM is an unrounded, +ATR/-ATR, non-high vowel; and C*u*-/C*ʊ*- if the V_1STEM is a rounded, +ATR/-ATR, non-high vowel respectively. Illustrations in (12b) show that, in addition to the V_1STEM, certain sets of stem-initial consonants (labials and palatals for the Igbo case) can also effect a change in the RED.

Second, CI-reduplication is not a phonological process but rather a morphophonological process (in almost all the sample languages). It can also be considered as a morpho-syntactic process as in Nupe (cf. 3.3.1.3) and Obolo (cf. 3.3.4) where reduplicated forms have full meaning in context. The resemblance between the VRED and the V_1STEM in Igbo is not accidental but rather context-sensitive, reason why the RED vowel copies [round], [back] and [ATR] features from the V_1STEM and/or the C_1STEM. Note however that besides the pattern of

CI-reduplication illustrated in (12) – where the VRED is conditioned by the V_1STEM and/or the C_1STEM – cross-linguistically, there exist other cases of CIR where the RED contains an unvariable high vowel rather than a single feature. In Emai (13) for example, the RED consistently comprises the high-toned vowel [*i*] independent of the V_1STEM.

(13) Emai (Orie 1997: 80 citing Egbokhare 1990): Persistive aspect

RedF	Gloss	Verb	Gloss
tí-tà	still say	< tà	say
gbí-gbè	still beat	< gbè	beat
dí-dà	still betray	< dà	betray

Third, the conception of CI-reduplication in Niger-Congo and beyond assumed within this work differs from most previous conceptions in two ways. First, I make it explicit that CI-reduplication is a morphophonological process that consists of prefixing an underspecified morpheme $|\sigma C_0 I\text{-}|$ to a given stem for grammatical purposes. Following an intuition from Marantz (1982: 436), CI-reduplication is therefore considered within this work as a normal affixation process with the exception that the affix resembles the stem to which it attaches to a certain extent. Second, I agree totally with Faraclas & Williamson 1984, Steriade 1988, Hyman, Inkelas & Sibanda 2009 that partial reduplication in general, and CI-reduplication in particular originates from total reduplication.

Finally, with regard to the foregoing discussion and the framework adopted within this investigation, both CI-reduplication with invariable RED (13) and CI-reduplication with a RED subjected to allomorphy (9c, 12) are considered as a similar process, a morphophonological process unlike Alderete et al. 1999 who consider them as being distinct, i.e., phonological vs. morphological fixed segmentism.

2.7. Categorization of CIR types

There are two crucial parameters of cross-linguistic variation upon which one could draw typological generalizations when categorizing CI-reduplication: form and function.

2.7.1. Formal characteristics and subtypes

Across languages, the basic formal distinction between CIR types is CI-reduplication with invariable nucleus (CIR Type I) versus CI-reduplication with variable nucleus (CIR Type III). However, in some languages namely, Yoruba (cf. 3.3.1.2), Oko (cf. 3.3.1.4), and Hyam of

Kwoi (cf. 3.3.2.3), the reduplicant is quasi-invariable. It associates characteristics of both CIR Types I and III listed in Table 2.1 that differentiate it from CIR types I and III reduplicants. This intermediate pattern has been labelled CIR Type II.

The aforementioned CI-reduplication major types can further split into sub-types. CIR Type I splits in two sub-types depending on the quality of the reduplicant fixed vowel. CIR Type II splits in three sub-types with regard to the quality of the segment initiating the VRED variation. CIR Type III further splits in three sub-types depending on the major factor governing the assimilatory process between the reduplicant and the stem-initial syllable. The sub-types in turn split in sub-sub-types with regard to the assimilator, i.e. the segment conditioning the VRED allomorphy. Cross-linguistically, the VRED is either solely conditioned by the V_1STEM, by both the VRED and the C_1STEM, or simultaneously by the quality of the VRED associated to that of the C_1STEM.

Synchronically, it is difficult to predict with exactness the behaviour of the RED in seven languages: Ninzo (cf. 3.3.2.2), Ningye (cf. 3.3.2.1), Obolo (cf. 3.3.4), Mwaghavul (cf. 3.2), Hyam of Kwoi (cf. 3.3.2.3), Beezen (cf. 3.3.3), and Zhoa (cf. 3.3.5.2) either because of an ongoing change (case of the first three languages), or because the data available is not sufficiently representative (case of the last four languages). Nevertheless, each of the aforementioned languages is assigned to one of the CIR Types (exception made from Mwaghavul, Beezen and Zhoa where very few non-representative examples on CIR were found so far); and conflicting properties yielding different results are also discussed along side.

Two major factors serve in determining the exact form of the RED for each of the types and subtypes in Table 2.1: (a) general constraints on CIR, and (b) language idiosyncrasies.

(a) General constraints (syllable weight and structure)

- The RED canonical shape is $\sigma C_0 I$-.
- The RED is invariably short (Steriadé Dona, p.c.), i.e.:
    - The RED onset is always monophonemic.
    - The VRED is always a short vowel irrespective of the V_1STEM (Hyman 1972).
- The VRED is always high (Hyman 1972, Faraclas & Williamson 1984).
- No language has a high rounded vowel as default for CIR.

(b) Language specific constraints

- The RED may be V- in shape for languages treating V and CV roots alike; or CVN- for languages allowing a nasal coda to reduplicate.
- The RED default vowel varies depending on any given language vowel system. It is always the high, unrounded central vowel [*ɨ*] for languages contrasting front vs. central vs. back high vowel; and [*i*] for language without central high vowels.
- The RED onset may determined allomorphy.
- The VRED vowel can be fixed or variable.
- The RED tone can be fixed or variable.
- The VRED can agree or not with the V_1STEM in height, backness and/or roundedness.
- The VRED can be nasalized irrespective of the V_1STEM.

Table 2.1. CI-reduplication formal types

CIR types		Characteristics	Languages
CIR Type I: invariant RED			
Type Ia	C*i*	no allomorphy	Emai, Arigidi
Type Ib	C*ɨ*	no allomorphy	Bafut, Vengo
CIR Type II: Quasi-invariant RED			
Type IIa	C*i*/ C*u*	allomorphy determined by the V_1STEM only	Yoruba, Fon (Abomey lect excluded)
Type IIb	ATR assimilation C*i*/ C*u*	allomorphy determined simultaneously by the V_1STEM and the C_1STEM	Oko, Hyam of Kwoi

CIR types		Characteristics	Languages
CIR Type III: Variant RED			
Type IIIa: Height assimilation			
(i)	CV[+high]	allomorphy determined by the V_1STEM or the C_1STEM [+hi, +lab, +rd]	Makaa, Krumen
(ii)	CV[+high, αgr]	allomorphy determined by the V_1STEM + Yes/No the C_1STEM is [grave].	Igbo, Fe'fe', Fyam, Ninzo, Obolo
Type IIIb: Place assimilation			
	C*i*/C*ɨ*/C*u*	allomorphy determined by the V_1STEM or the C_1STEM [+hi, +lab, +rd]	Kutep, Tarok
Type IIIc: Roundedness assimilation			
(i)	C*i*(*ɪ*)/C*u*(*ʊ*)	allomorphy determined by the V_1STEM only	Fon (Abomey lect), Abidji, Attié, Nupe, Hyam of Nok, Anyin, Kulango
(ii)	C*i*(*ɪ*)/C*u*(*ʊ*)	allomorphy determined by the V_1STEM and/or the C_1STEM [+hi, +lab, +rd]	Akan, Isu, Ron, Ningye
Non-classified[11] languages:			Mwaghavul, Zhoa, Beezen

The formal types in Table 2.2 represent points of clustering in a spectrum ranging from maximal fixation of the reduplicant high vowel to its maximal variation according to a considerable number of determining environments outlined in Table 2.1.

Table 2.2. A spectrum of CI-reduplication clusters

Forms C_1+V_1STEM	CIR Type I		CIR Type II			CIR Type III		
	(a)	(b)	(a)	(b)	(c)	(a)	(b)	(c)
CV[+fr, -bk]							*i*	
CV[-fr, -bk]							*ɨ*	
CV[-fr, +bk]							*u*	
CV[-rd]								(*ɨ*)/ *i* (/*ɪ*)
CV[+rd]								*u* (/*ʊ*)
C*i*	*i*	*ɨ*	*i*	*i*	*I*	*i*		
C*I*	*i*	*ɨ*	*i*	*i*	*I*	*I*		
C*e*	*i*	*ɨ*	*i*	*i*	*I*	(*ɨ*)		

[11] Non-classification here refers to CIR formal patterns.

C*ɛ*		*i*	*ɨ*	*i*	*ɛ* ~ CV	*I*	(*ɨ*)		
C*ɨ*		*i*	*ɨ*	*i*	*i*	*I*	(*ɨ*)		
C*a*		*i*	*ɨ*	*i*	*ɛ* ~ CV	*I*	(*ɨ*)		
C*ə*		*i*	*ɨ*	*i*	*ɛ* ~ CV	*I*	(*ɨ*)		
C*ɔ*		*i*	*ɨ*	*i*	*ɛ* ~ CV	*I*	(*ɨ*)		
C*o*		*i*	*ɨ*	*i*	*ɛ* ~ CV	*I*	(*ɨ*)		
C*ʊ*		*i*	*ɨ*		*i*	*I*	*ʊ*		
C*u*		*i*	*ɨ*	(*i* ~) *u*	*i*	*I*	*u*		
C[+Lab]V[-high]							(*u*)		
fu					*u*				
WV							*u*		(*u*)
W^{j}*i*							(*i*)		
JV							*ɨ*		
C^{w}*i*							(*u*)	*u*	(*u*)
C^{j}*u*								*i*	(*i*)/(*u*)
C^{w}V[-high]						*u*	(*u*)	*u*	(*u*)
C^{j}V[+high]							(*i*)	*i*	
C^{j}V[-high]							(*i*)	*i*	(*i*)
C$_{[+gr]}$^{w}V							(*u*)		
C$_{[-gr]}$^{w}V[+high]									(*i*)
C$_{[+gr]}$^{j}V									(*i*)
C$_{[-gr]}$^{j}V							(*i*)		
C$_{[+gr]}$V[-high]							(*u*)/(*ɯ*)		
C$_{[-gr]}$V[-high]							(*i*)		

2.7.1.1. CIR Type I

CIR Type I refers to cases where the RED has a fixed vowel. In Arigidi (CIR Type Ia) (14a) for example, irrespective of the V_1STEM and the C_1STEM qualities, the RED is consistently C*i*-. Likewise, in Bafut (CIR Type Ib) (14b), the RED is always C*ɨ*-.

(14) a. Arigidi (Ola-Orie 1997: 55): Frequentative

RedF	Gloss	verb	Gloss
kpì-kpɛ́:	dig here and there	< kpɛ́:	dig
kì-kó:	sing here and there	< kó:	sing
ʤì-ʤɛ́:	dance here and there	< ʤɛ́:	dance

b. Bafut (Tamanji 2009: 207, 2012: 59): Noun formation

RedF	Gloss	Simplex
à-*tsɨ́-t*saʔà	mud	?? tsaʔa
à-*lɨ́-*ləə́	bat	?? ləə
à-*kɨ̀-*kúŋ	owl	?? kuŋ
à-*kɨ̀-*koʔò	dumb person	?? koʔo

2.7.1.2. CIR Type II

CIR Type II refers to languages with a quasi-fixed RED varying with respect to either the V_1STEM, the C_1STEM, or both. In general, it has been observed across languages that the RED allormorphy is conditioned by three major factors namely, height (high vs. non-high vowels), place (front vs. central vs back vowels), and roundedness (round vs. unrounded vowels) assimilations. The aforementioned factors refer to natural classes of segments that trigger the VRED (cf. 2.7.1.3 for detail). In CIR Type II languages therefore, the RED is described as quasi-fixed as it is almost invariable, and its allomorphy is triggered by individual segments that constitute sub-sets of the natural class of round segements. In CIR Type IIa languages, the default RED is C*i*-, and it turns to C*u*- if only the V_1STEM is the high, back, rounded vowel [*u*]. In CIR Type IIb languages, the default RED is C*i*-, and it turns to C*u*- in some restricted labial environments, i.e., either when the V_1STEM is the high, back, rounded vowel [*u*] followed by the labio-dental fricative consonant [*f*], or by a labio-velarized consonant (as in CIR Type III languages). The fact that in CIR Type II languages, the RED is almost fixed, i.e. C*i*-, as in CIR Type I languages; and that the unique and major factor governing the RED allomorphy is roundedness assimilation as in CIR Type IIIc (though triggering segments are restricted sets of rounded consonants and vowels) certainly suggests that a transition is going on either from CIR Type I to CIR Type IIIC, or the other way round.

In Yoruba (15) (cf. 3.3.1.1), as well as in Fon (Phla-Phéra and in most Fon lects, Abomey excluded) (cf. 3.3.6.4), CIR Type IIa languages, the default VRED is C*i*- (15a/c) and it turns to C*u*- when the V_1STEM is [*u*] (15b). Note however that the assimilation of backness by the VRED, when the stem is C*u*, is optional in Yoruba (Akinlabi 2004: 288).

(15) Yoruba (Akinlabi 2004: 288f.): Action and stative noun

a. High unrounded vowel stems

RedF	Gloss	Verb	Gloss
wí-wí	saying	< wí	say
dí-dì	tying	< dì	tie

b. High rounded vowel stems

bí-bú ~ *bú*-bú	cursing	< bú	curse
kí-kū ~ *kú*-kū	butchering	< kū	butcher

c. Non-high vowel stems

fí-fɔ̀	washing	< fɔ̀	wash
gbí-gbà	accepting	< gbà	accept

In Oko (cf. 3.3.1.4), a CIR Type IIb language, the appropriate form of the RED varies depending on the function fulfilled by CIR, nouns derived from action vs. quality verbs. For both functions (16), when the V_1STEM is [+ATR], the RED is C*i*-, and it turns to C*u*- if only the stem comprises the high, back, rounded vowel [*u*] preceded by the labio-dental fricative [*f*].

(16) Oko (Atoyebi 2010: 76f.): Action and quality nouns

a_i. $CV_{[+ATR]}C_0$ action verb stems

RedF	Gloss	Verb	Gloss
ò-sí-sīē	doing	< sīē	do
ò-rí-rō	thinking	< rōrō	think
ò-sí-sū	marrying	< sú	marry

ii. *fu*-intial Verb stems

RedF	Gloss	Verb	Gloss
ò-fú-fūrū	jumping	< fùrū	jump

b_i. $CV_{[+ATR]}C_0$ quality verb stems with

RedF	Gloss	Verb	Gloss
ò-gbí-gbōdī	being fat/big	< gbōdī	be big/fat
ò-fí-fī	being hot	< fí	be hot
ò-gí-gīŋān	being sour	< gíŋán	be sour

ii. *fu*-intial Verb stems

RedF	Gloss	Verb	Gloss
ò-fú-fūn	being wet/cold	< fún	be wet/cold

On the contrary, if the V_1STEM is [-ATR], due to vowel harmony and the lack of [-ATR] high vowels in Oko, the VRED lowers to [*ɛ*] in the case of nouns derived from action verbs (17a). For nouns derived from quality verbs, the RED is rather identical to the stem-initial CV (17b), Atoyebi (2010: 76f.).

(17) Oko (Atoyebi 2010: 76f.): Action and quality noun

a. Nouns derived from [-ATR] action verb stems

RedF	Gloss	Verb	Gloss
ɔ̀-gbɛ́-gbā	seeing	< gbá	see
ɔ̀-sɛ́-sɛ̄	catching	< sɛ́	catch

b. Nouns derived from [-ATR] quality verb stems

RedF	Gloss	Verb	Gloss
ɔ̀-fɔ́-fɔ̄	being tall	< fɔ́	be tall
ɔ̀-bɛ́-bɛ̄rɛ̄	being soft	< bɛ̄rɛ̄	be soft

Synchronically, the data available makes it a difficult task to describe CIR in Hyam of Kwoi (cf. 3.3.2.3) accurately. However, based on remnant traces left by CIR, Hyam of Kwoi is classified as CIR Type IIb as it seems the default RED was C*ɪ*- at the origin (18a), exception made from (18b) where the RED surfaces as C*i*-. It is also observed that the RED agrees in backness and tenseness with the stem, turning to C*u*-, when the V_1STEM is [*u*] (as in Yoruba, Fon of Abomey , CIR Type IIa languages; or Oko, CIR Type IIb), or when the C_1STEM is a labio-velarized consonant (as in CIR Type III languages) (18c).

(18) Hyam (Gerhardt 1988: 53ff.): Continuous aspect/Distributive plural

	RedF	Gloss	Verb	Gloss
a.	kp*í*-kpé	do continuously	< kpé	do
	ɣí-*ɣí*	eat continuously	< *ɣí*	eat
	d*í*-dúrə́	search continuously	< dúrə́	search
	ʧ*ī*-ɲʧā:	houses of different people	< ʧā:	house
	ɲ*ì*-ɲí	mouths of different people	< ɲí	mouth
b.	ʧí-ʧép	speeches from different people	< ʧép	speech
c.	ʃú-ʃú	faces of different people	< ʃú	face
	ʧwù-ʧwēky	noses of different people	< ʧ*wēkȳ*	nose

2.7.1.3 CIR Type III

CIR Type III refers to cases where the RED has several allomorphs each suited to a specific context. Three primary mechanisms govern the assimilatory process conditioning the VRED in languages with a variable RED.

- **Height assimilation** (high vs. non-high vowels) as in Igbo (cf. 3.3.1.2), Krumen (cf. 3.3.7), Ninzo (cf. 3.3.2.2), Obolo (cf. 3.3.4), Fe'fe' (cf. 3.3.5.3), Fyam (cf. 3.3.2.4), and Makaa (cf. 3.3.5.5).
- **Place assimilation** (front vs. central vs. back vowels) as in Kutep (cf. 3.3.3), and Tarok (cf. 3.3.2.5).
- **Roundedness assimilation** (round vs. unround vowels) as in Isu (cf. 3.3.5.2), Hyam of Nok (cf. 3.3.2.3), Anyin (cf. 3.3.6.1), Nupe (cf. 3.3.1.3), Abidji (cf. 3.3.6.1), Attié (cf. 3.3.6.2), Akan (cf. 3.3.6.3), Fon (Abomey lect) (cf. 3.3.6.4), Kulango (cf. 3.3.8), Ron (cf. 3.2), and Ningye (cf. 3.3.2.1).

The aforementioned primary triggering and conditioning factors combine with secondary factors – discussed under §2.7.1.4 and §2.7.1.5 Consonant and vocalic morphophonological changes – in determining the RED exact allomorph, namely: (i) graveness (Igbo, Fyam, Obolo, Fe'fe', and Ningye), (ii) Advanced tongue root (ATR) (Igbo, Akan, Isu, Anyin, Hyam of Nok, Oko, and Abidji), (iii) superimposition of labiality solely (Ninzo), (iv) superimposition of both labiality and palatality (Tarok, Kutep, Makaa, Igbo, and Ron), (v) roundedness (Krumen, and Akan), and (vi) nasality (Yoruba, Anyin, Akan, Fon, and Krumen).

In CIR Type IIIa languages – Makaa, Krumen, Ninzo, Igbo, Fe'fe', Fyam, and Obolo – Allomorphy is primarily determined by Yes/No the V_1STEM is high. Put differently, the main point is that the presence of a high vowel within a stem always issues total assimilation (19).

(19) a. Fyam (Blench 2010a: 7): Noun plural

RedF	Gloss	Noun	Gloss
bà-ʧì-ʧi	heads	< ʧi	head
rí-rìjà	hearts	< rìjà	heart
ɗú-ɗùr	bulls	< ɗùr	bull

b. Igbo (Alderete et al. 1999: 20): Action and stative noun

ti-ti	cracking	< ti	crack
mɪ-mɪ	drying	<mɪ	dry
ju-ju	being	< ju	be

In case the V_1STEM is non-high, it is not copied, but a default high vowel appears in the RED. The default vowel is [*ɨ*] for languages having a central high vowel (20a), and [*i*] for languages contrasting high front vs. back vowels (20b), i.e. those which lack a central high vowel in their inventory.

(20) a. Makaa (Ibirahim 2013: 278f.): Diminutives

RedF	Gloss	Noun	Gloss
bɨ́-bán-ú	small buttock	< bán	buttock
fɨ́-*j*ěndjá	small plait	< ěndjá	plait
bɨ̀-bɛ́ːnd-ú	small thight	< bɛ̀ːnd	thight
kɨ́-kə́l-ú	small voice	< kə́l	voice
zɨ́-zòːl-ú	small pangolin	< zòːlú	pangolin

b. Ninzo (Hoerner 1980: 94ff.): Noun plurality

RedF	Gloss	Noun	Gloss
à-gbí-gblédʒá	ankles	< í-gblédʒá	ankle
ā-kpī-kpárʤā	heels	< ì-kpī-kpárʤā	heel
í-mŋgbí-mgŋbēkū	navels	< ì-mŋgbèkú	navel

CIR Type IIIb refers exclusively to languages with the contrast high, front vs. central vs back vowels. Kutep and Tarok are the only languages found so far. In Kutep, as in Tarok, Allomorphy is primarily determined by the V_1STEM place of articulation. The RED is C*ɨ*- for front vowel stems (21a), C*ɨ*- for central vowel stems (21b), and C*u*- for back vowel stems (21c).

(21) Kutep (Koops 2009: 21): Action nouns

a. Stems with front vowels

RedF	Gloss	Verb	Gloss
fī-fēr	closing by	< fēr	close by
pì-pìnn	flying	< pìnn	fly

b. Stems with the low central unrounded vowel [a]

kɨ̄-kāb	thinking	< kāb	think
sɨ̀-sà	taking	< sà	take

c. Stems with a back vowel

kū-kōb	sewing	< kōb	sew
tū-tō	cooking	< tō	cook

In CIR Type IIIc languages – Abidji, Attié, Anyin, Hyam of Nok (cf. 3.3.2.3), Fon (Abomey lect), Akan, Isu, Kulango, Ron, Nupe, and Ningye – Allomorphy is primarily determined by Yes/No the V_1STEM is round. Put differently, the main point is that the presence of a round vowel within a stem in all CIR Type IIIc languages always issues a C*u*-. In Attié, the RED is C*i*- for stems with unrounded vowels (22a), and C*u*- for stems with rounded vowels (22b).

(22) Attié (Bogny 2005:17): Function not stated in the source

a. Stems with unrounded vowels

RedF	Verb	Gloss
bī-bɤ̀	< bɤ̀	bake
bí-bì	< bí	blacken
bī-bʌ̀	< bʌ̀	come
lī-là	< lā	sleep
tī-tɛ̃	< tɛ̃	hear

b. Stems with rounded vowels

bū-bò	< bò	shatter
bū-bɔ̀	< bɔ̄	germinate
bú-bù	< bú	break
dū-dṵ̃	< dṵ̃	wive

In Isu , the RED is C*ɨ*- (23a) for stems with unrounded vowels. The VRED agrees in backness and tenseness (C*u*-/C*ʊ*-) with the V_1STEM if it is an unrounded vowel (23b).

(23) Isu (Kießling 2012: 9f): Lexical derivation/Adjective intensification

a. stems with unrounded vowels

RedF	Gloss	Simplex	Gloss
kə́-*sɨ́*-sí	sand, sandy place	?? si	
sɨ̀-sɨ̀ə	very small	< *sɨ̀ə*	small
mɨ̂-miə́lə́	very deep	< míəlí	deep
kʰ*ɨ̂*-kʰí↓	very wet	< kài	wet
m-*gbɨ́*-ŋgbáŋ	brain	?? ŋgbaŋ	
kə̀-*dzɨ̀*-dzə̀	fly	?? dzə	
kə́-*tsɨ́-tsàʔá*	clod of soil, lump of earth	< í-*tsáʔ*	clay

b. stems with rounded vowels

kə̀-bvù-bvùrì	dust (infested with jiggers)	< kə́-bvû	dust
kə́-fú-fú	tortoise	?? fu	
kə́-ndzú-ndzúə́	toad	?? ndzuə	
zʊ̂-zʊ́ə́ə	very clean	< zʊ́	clean
dʊ̂-dʊ́w↓	very wide	< dʊ̀w	wide
dzʊ̂-dzʊ́nə́	very old	< dzʊ̀n	old
kə́-vú-vɔ́ŋɔ́	soldier ant	?? vɔŋɔ	

No language with a central high vowel has a front high vowel as default. No language also has a rounded high vowel as default vowel. It is less probable to find a language with *C*y*-, *C*Y*-, *C*ʉ*-, *C*ʊ*-, *C*u*- as the default RED. Consequently, here and thereafter the RED in Niger-Congo and in the West Chadic languages with CIR will be written CI- in languages where all the allomorphs are predictable. The archiphoneme //I// represents the various realizations of the VRED observed across languages.

2.7.1.4. Consonantal morphophonological changes

It has been observed across CIR Type II and III languages that stem-initial consonants, namely, (i) labials, (ii) palatals; (iii) grave consonants, i.e. labials and velars as opposed to non-grave consonants, alveolars and palatals, also conditioned the VRED. The different cases are surveyed in the following sub-sections.

2.7.1.4.1 Labial consonant-initial stems

The term labial is used here to refer to bilabial, labio-dental, labio-velar and labio-velarized consonants. Igbo and Ninzo are so far the only language where the bilabial nasal (24b) spread labiality on the VRED.

(24) Igbo (Ihiunu & Kenstowicz 1994: 3): Action nouns

a. Reduplicative with default RED

RedF	Gloss	Verb	Gloss
sì-sè	stirring	< í-sè	stir (water)
ṭí-ṭá	biting	< *í*-ˡṭá	bit

b. Labiality assimilation

mú-mé	making	< í-ˡmé	make
mú-má	knowing	< *í*-ˡmá	know

In Oko there is complete identity between the RED and the stem-initial CV if only it comprises the high back rounded vowel [*u*] preceded obligatorily by the labio-dental voiceless fricative [*f*][12].

(25) Oko (Atoyebi 2010: 76f.): Action and quality noun

RedF	Gloss	Verb	Gloss
ò-sí-sū	marrying	< sú	marry
ò-fú-fūrū	jumping	< fùrū	Jump
ò-fú-fūn	being wet/cold	< fún	be wet/cold

In Kulere, Makaa, Igbo, Fyam and Krumen, the labio-velar glide [*w*] spans labiality on the VRED (26a). On the other hand, in Ninzo, Ningye and Krumen (26b), labio-velar plosives or prenasals turn the VRED to [*u*] (this vowel may agree in [ATR] with the stem vowel in languages where this feature is contrastive). In contrast with labio-velar plosives or prenasals – which do not always effect a change on the VRED – the labio-velar glide [*w*] without exception spreads labiality in all languages in which examples were provided.

[12]Examples of stems with [*u*] as nucleus and labial consonants such as [*f*], [*m*], [*gb*] where not given in the primary source to have a broad and complete picture of the reduplication of stems with labial onsets followed by [*u*].

(26) a. Makaa (Ibirahim 2013: 278ff.): Diminutives

RedF	Gloss	Nouns	Gloss
wù-wǎːg-ú	small chimpazee	< wàːg	chimpanzee
wú-wójà	small case	< wójà	case
wù- wǎːs-ú	small comb	< wàːs	comb

b. Ninzo (Blench 2011a: 6ff.): Lexical formation and plurality

RedF	Gloss	Simplex	Gloss
ú-ŋgbú-ŋgbá	ensete	?? ŋgba	
ā-kpū-kpà	friends	< ū-kpà	friend
kpuŋ-kpaŋ	eggs	< kpaŋ	egg

In all sample languages, if the C_1STEM is a labio-velarized consonant, the V_1STEM always assimilates roundedness.

(27) Kutep (Koops 2009: 21): Action noun

RedF	Gloss	Verb	Gloss
kú-kwáb	tying	< kwáb	tie
pù-pwèn	counting	< pwèn	count
ʧwú-ʧwé	agreeing	< *í*-ʧwé	agree

2.7.1.4.2 Palatal consonant-initial stems

Palatal as used within this investigation refers to consonants sharing palatality as primary or secondary place of articulation, i.e., palatal and palatalized[13] consonants. All through the sample data, if the C_1STEM is the palatal glide [*j*] (28a) or a palatalized consonant (28b), the VRED is always [*i*] (cf. 2.7.1.4.3, example (31) for *ju* and C^j*u* cases).

(28) Fyam (Blench 2010a: 7): Noun plurality

a. Palatal glide-initial stems

RedF	Gloss	Noun	Gloss
jí-jàn	elephants	< jàn	elephant
jí-jèt	buffalo	< jèt	buffalo
jí-jòŋ	hunger	< jòŋ	hunger

[13] Palatalized consonants in Ningye seem to behave differently depending on whether the primary articulatory sound is a bilabial or velar as opposed to palatal consonants. If the C_1STEM is a labio-velarized bilabial or velar sound, the VRED is [*u*]. On the other hand, if the C_1STEM is a palatalized palatal consonant, the VRED is [*i*], see 31b).

b. Palatalized consonant-initial stems

RedF	Gloss	Noun	Gloss
ní-njɛ̀n	foreheads	< njɛ̀n	forehead
ɗí-ɗjèp	grasscutters	< ɗjèp	grasscutter
lí-ljaŋ	black kites	< ljàŋ	black kite

2.7.1.4.3 Grave vs. non-grave consonant-initial stems

As earlier mentioned by Hyman (1973: 329) in support of the Jakobsonian feature [grave], there are data from African languages showing a contrast in the behavior of labial and velar consonants on the one hand and dental/alveolar and palatal consonants on the other hand. Hyman puts forth two major claims inherent to the [grave] feature distinction:

- Labial and velar consonants [+grave] as opposed to dental/alveolar consonants [-grave] constitute a natural class;
- Labial and velar consonants pattern with back vowels while dental/alveolar consonants pattern with front vowels.

Five cases, Obolo (cf. 3.3.4), Fe'fe' (cf. 3.3.5.3), Igbo (cf. 3.3.1.2), Fyam (cf. 3.3.2.4) and Ningye (cf. 3.3.2.1) illustrate the contrastive behavior of labial, velar vs dental/alveolar consonants across the sample data. The aforementioned cases show a two-way contrast. Alveolar and palatal consonants in these languages are transparent to labiality in contrast with labial and velar consonants that are opaque. Another contrast observed is that, in Fe'fe', Obolo, and Igbo, labial and velar consonants either trigger or allow labiality to spread from the V_1STEM onto the RED whereas in Fyam and Ningye they do not.

In Fe'fe' (Hyman 1973: 333f.), whenever the V_1STEM is [*e*] (29a/b), [*ɛ*] (29c/d) or [*a*] (29e/f) and the C_1STEM is an alveolar or a palatal, the VRED is [*i*] rather than the unmarked vowel [ɨ].

(29) Fe'fe' (Hyman 1973: 333f.): Restrictive/Continuous aspect

a. C*e* stems with bilabial and/or velar-initial onsets

RedF	Gloss	Verb	Gloss
pī-pe:	hate only and continously	< pe:	hate
kī-ke:	refuse only and continously	< ke:	refuse

b. C*e* stems with alveolar and/or palatal-initial onsets

RedF	Gloss	Verb	Gloss
tī-tē:	remove only and continously	< tē:	remove
jī-jē:	see only and continously	< jē:	see

c. C*ɛ* stems with bilabial and/or velar-initial onsets

RedF	Gloss	Verb	Gloss
pī-pɛn	accept only and continously	< pɛn̄	accept
ɣī-ɣɛn	go only and continously	< ɣɛn̄	go

d. Cɛ stems with alveolar and/or palatal-initial onsets

RedF	Gloss	Verb	Gloss
tī-tɛn̄	stand up only and continuously	< tɛn̄	stand up
ʧī-ʧɛn̄	moan only and continously	< ʧɛn̄	moan

e. C*a* stems with bilabial and/or velar-initial onsets

RedF	Gloss	Verb	Gloss
pī-pā*ʔ*	commit suicide only	< pā*ʔ*	commit suicide
kī-kā*ʔ*	grill only and continously	< kā*ʔ*	grill

f. C*a* stems with alveolar and/or palatal-initial onsets

RedF	Gloss	Verb	Gloss
tī-tā*ʔ*	bargain only and continously	< tā*ʔ*	bargain
ʧí-ʧák	trample only and continously	< ʧák	trample

In Igbo, if the C_1STEM is either an alveolar or palatal consonant (30a/b) and the V_1STEM non-high, be it unrounded or rounded, the VRED is always [*i*]. On the contrary, if the C_1STEM is a labial or velar, the VRED is invariably a rounded back vowel agreeing in [ATR] with the V_1STEM (30c/d).

(30) Igbo (Ihiunu & Kenstowicz 1994: 2f.): Action and stative noun

a. Non-high rounded vowel stems with alveolar and palatal-initial onsets

RedF	Gloss	Verb	Gloss
sí-ső	pricking	< í-ˡső	prick
ʤí-ʤɔ́	being uggly	< *í*-ˡʤɔ́	be uggly

b. Non-high unrounded vowel stems with alveolar and palatal-initial onsets

RedF	Gloss	Verb	Gloss
sì-sè	stirring	< í-sè	stir (water)
ʈɾ́-ʈá	biting	< *ɾ́*-ˡʈá	bite

c. Non-high unrounded vowel stems with labial and velar-initial onsets

RedF	Gloss	Verb	Gloss
mú-mé	making	< í-ˡmé	make
fʊ́-fá	stuffing	< *ɾ́*-ˡfá	stuff
gbú-gbé	crawling	< í-ˡgbé	craw

d. Non-high rounded vowel stems with labial and velar-initial onsets

RedF	Gloss	Verb	Gloss
gʊ́-gɔ́	denying	< *ɾ́*-ˡgɔ́	deny
fú-fó	uprooting	< í-ˡfó	uproot

In Fyam and Ningye, the VRED assimilates labiality if the V_1STEM is a back, rounded vowel and the C_1STEM an alveolar or a palatal. Very few examples[14] were found in Fyam and Ningye to illustrate consistently the contrast between [αgrave] consonants. A single example was found in Fyam (31a) where the RED is C*u*- if the V_1STEM is a back, non-high, rounded vowel and the C_1STEM an alveolar implosive consonant. In Ningye (31b), it is noticed that, the RED is C*u*- if the V_1STEM is [*u*], and the C_1STEM a palatalized coronal; and C*i*- if the C_1STEM is rather a palatalized velar.

(31) a. Fyam (Blench 2010a: 7): Noun plural

RedF	Gloss	Noun	Gloss
ɗú-ɗò	rooms	< ɗò	room

b. Ningye (Blench 2011c: 4): Noun plural

RedF	Gloss	Noun	Gloss
ʧu-ʧju	veins	< ʧju	vein
gi-gju	thieves	< gju	thief

[14] More data is needed both in Fyam and Ningye in order to mark a clear distinction between [±grave] consonants.

2.7.1.4.4 CC, NC, Cw, and Cj sequences in CI-reduplication

Consider the examples below paying attention to the behaviour of CC, NC, Cw, C*ɥ*, Cj, and Kh clusters.

(32) a. CC clusters

Krumen (Marchese 1979: 101f.): Action nouns

RedF	Gloss	Noun	Gloss
gbʊ́-gblá	sewing	< gblá	sew
kí-kleˈ	catching	< kleˈ	catch

b. NC clusters

Ninzo (Hoerner 1980: 49/94): Noun and adjective plurality

RedF	Gloss	Noun	Gloss
í-mŋgbí-mgŋbēkū	navels	< ì-mŋgbèkú	navel
u-ŋkpí-kpí	large/big	< àŋkpì	large/big

c. Cw clusters

Cws are copied in the RED

Igbo (Ihiunu & Kenstowicz 1994: 2f.): Action nouns

RedF	Gloss	Noun	Gloss
ŋʷʊ̀-ŋʷà	tempting	< *í*-ˈŋʷà	tempt
kʷʊ̀-kʷà	pushing	< *í*-ˈkʷà	push

Cws are copied in the RED if only the C_1STEM is coronal

Igbo (Ihiunu & Kenstowicz 1994: 2f.): Action nouns

RedF	Gloss	Noun	Gloss
ʧwú-ʧwé	agreement	< *í*-ʧwé	agree
*kú-kwáb	trying/trial	< kwáb	try

Cws are not copied in the RED

Fyam (Blench 2010a: 7): Noun plurality

RedF	Gloss	Noun	Gloss
mbú-mbwì	mushrooms	< mbwì	mushroom
kú-kwèːr	streams	< kwèːr	stream

d. C*ɥ* clusters

C*ɥ*s are copied

Akan (Akuapem) (Schachter & Fromkin 1968: 157ff.): Pluractional

RedF	Gloss	Noun	Gloss
ʧɥi-ʧɥeʔ	cut repeatedly	< mbwì	cut

C*ɥ*s are copied in the RED if only the C_1STEM is a palatal segment

Fe'fe' (Petit Diboum lect) (Hyman 1972: 106): Restrive/Continuous aspect

RedF	Gloss	Noun	Gloss
ʧɥī-ʧɥɛ̄ːʔ	copulate only and continously	< ʧɥɛ̄ːʔ	copulate
ʧɥī-ʧɥēː	cut only and continously	< ʧɥēː	cut
*pū-pɥɛn̄	howl only and continously	< pɥɛn̄	howl
*kū-kɥeˈːn	join only and continously	< kɥeˈːn	join

e. C*j* clusters

C*j* is copied in the RED only if C1STEM is the labio-velar glide [*w*]

Ninzo (Blench 2011b: 6ff.): Lexical formation and plurality

RedF	Gloss	Noun	Gloss
ī-wjī-wjírr	arrows (PL)	< ā-wjírr	arrow
* ī-gbī-gbjâr	throat (SG)	??gbjar	

C*j* is not copied in the RED

Kulere [Ron] (Schachter & Fromkin 1968: 157ff.): Pluractional

RedF	Gloss	Noun	Gloss
bí-bjél	tails	< bjêːl	tail
dī-djèn	houses	< djèn	house

f. C*h* clusters

Igbo (Anyanwu 1996: 61f.): Noun

RedF	Gloss	Noun	Gloss
ò-kʰʊ́̃-kʰɔ́̃	telling/narrating	< *ɨ́*-kʰɔ́̃	tell/narrate
-pʰ*ɪ́*-pʰ*ɪ́*	whittling	< *ɨ́*-ˈpʰ*ɪ́*	whittle

A keen look at the representative data in (32) reveals the following with regard to the behavior of consonant clusters:

- CC clusters never reduplicate (32a), Krumen (cf. 3.3.7), Kulango (cf. 3.3.8), Fon (cf. 3.3.6.4), and Ninzo (cf. 3.3.2.2).
- NC clusters always reduplicate (32b) as in Ninzo, Makaa (cf. 3.3.5.5), Fe'fe' (cf. 3.3.5.3), Bafut (cf. 3.3.5.4), Fyam (cf. 3.3.2.4), and Ningye (cf. 3.3.2.1).
- C*w* clusters show a two-way contrast (32c). They are copied in Igbo (cf. 3.3.1.2), Kutep (cf. 3.3.3), and in Akan (cf. 3.3.6.3); and not in Fyam, Tarok (cf. 3.3.2.5), Obolo (cf. 3.3.4), Vengo (cf. 3.3.5.1), Isu (cf. 3.3.5.2), Makaa, and in Ron (cf. 3.2). In Kutep however, labio-velarized coronals, e.g. [*ʧw*], reduplicates whereas labio-velarized bilabials and velars, [*bw, kw*] fail to do so.
- C*ɥ* clusters are copied in Aka (32d); and in Fe'fe' (cf. 3.3.5.3), Petit-Diboum lect, when the C_1STEM is a palatal segment.
- C*j* clusters never reduplicate, cf. Ron, Ningye, Fyam, Makaa, Tarok, Kutep, Obolo, and Attié (cf. 3.3.6.2). However, *wj* is copied in Ninzo but not *kj* (32e).
- C*h* clusters reduplicate in Igbo (32f).

From the foregoing analysis, it appears that a problem for concern while dealing with Ci-reduplication is determining whether or not consonant clusters are monophonemic (single units) or biphonemic (clusters of segments). The fact that CCs never reduplicate whereas C*ws*, C*ɥs*, C*js* may or may not reduplicate in a given language or in some languages suggests certainly that they may have different status in the underlying representation (UR), i.e they may be biphonemic in contexts where they don't reduplicate and monophonemic in contexts where they do. A strong argument in support of the monophonemic status of C*ws*, C*ɥs*, and C*js* which reduplicate is the general constraint determing the RED weight (cf. 2.7.1). Recall, it was previously stated that the RED is invariably short, i.e. always comprising a monophonemic onset followed by a short vowel, unlike the complexity of the stem-initial consonant and the length of its vowel. Recognizing that C*ws*, C*ɥs*, and C*js* can behave as single units or sequences of consonants depending on the context has another advantage as it enables to dismiss an apparent but non-existent exception of glides not being copied in certain languages. As a consequence, here and after, distinguish between monophonemic /C^{w}/, /$C^{ɥ}$/, and /C^{j}/ vs. biphonemic /C*w*/, /C*ɥ*/, and /C*j*/.

2.7.1.5. Vocalic morphophonological changes

Four major vocalic changes, in CI-reduplication systems, combine with the primary features in §2.7.1.3 to determine the reduplicant exact phonetic form, viz: (i) vowel shortening, (ii) nasal assimilation, (iii) ATR harmony, and (iv) roundedness assimilation.

2.7.1.5.1 Vowel shortening

In none of the target languages is wowel lengthening transferred onto the reduplicant as the VRED is constrained to be always short.

(33) a. Makaa (Ibirahim 2013: 278ff.): Diminutives

RedF	Gloss	Noun	Gloss
lí-lí:	small tree	< lí:	tree
dʒù-dʒǔ:	small tigh	< dʒù:	tigh
wù-wǎ:g-ú	small chimpanzee	< wà:g	chimpanzee
zɨ́-ʐò:lú	small pangolin	< zò:lú	pangolin

b. Vengo (Schaub 1985: 353ff.): Progressive aspect

RedF	Gloss	Perfective forms	Gloss
ˈkɨ́-ˈkú:nə́	is returning	< ˈkú:nə́	returned
ˈfɨ́-ˈfé:	is fearing	< ˈfé:ˈfé:	feared

2.7.1.5.2 Nasal assimilation

Nasal assimilation across CI-reduplication systems show a three-way contrast.

(i) Nasality spans from the V_1STEM onto the VRED in Anyin (cf. 3.3.6.1), Akan (cf. 3.3.6.3), Fon (cf. 3.3.6.4), Igbo (cf. 3.3.1.2) and Krumen (cf. 3.3.7).

(34) Igbo (Anyanwu 1996: 2f./61f.): Action noun

RedF	Gloss	Noun	Gloss
ɔ̀-zĩ́-zà̰	sweeping	< ɨ́-zà̰	sweep
ò-zṵ̀-zò̰	raining	< í-zò	rain
ŋʷʊ̀-ŋʷà	tempting	< ɨ́-ˈŋʷà	tempt
sɨ́-sɔ́	pricking	< í-ˈsɔ́	prick

(ii) Nasal assimilation in Yoruba (cf. 3.3.1.1) is optional. However, the RED is allow to copy nasality if only the VRED is a high vowel (35a/b). Note that nasality and backcopying go together. the failure to copy of one of the features renders the reduplicative ungrammatical (35c).

(35) Yoruba (Akinlabi 2004: 288f.): Action and stative nouns

a. high vowel stem

RedF	Gloss	Noun	Gloss
kí-kű ~ kű-kű	being full	< kű	be full
gbí-*gbī̃* ~ *gbī̃-gbī̃*	moaning	< *gbī̃*	moan
hí-hṹ ~ hű-hṹ	weaving	< hṹ	weave
sí-*sī̃* ~ *sī́-sī̃*	burying	< *sī̃*	bury

b. non-high vowel stem

RedF		Gloss	Noun	Gloss
fí-fɔ̃	*fī́-ɟɔ̃	blowing	< fɔ̃	blow
tí-tà̃	*tī́-ɪà̃	deceiving	< tà̃	deceive

c. ungrammatical cases

Copying of nasality only	Copying of roundedness only
*kĩ-kũ	*ku-kũ
*hĩ-hũ	*hu-hũ

(iii) The VRED fails to copy nasality from the V_1STEM in Makaa (cf. 3.3.5.5), and Attié (cf. 3.3.6.2).

(36) a. Makaa (Ibirahim 2013: 291ff.): Diminutives

RedF	Gloss	Noun	Gloss
ʧí-ʧő	small mouse sp.	< ʧo̰	mouse
ŋkú-ŋkwo̰	small wind	< ŋkwo̰	wind
ntɨ̀-ɲtő	small mole (rat)	< nto̰	mole
bì-bɛ́	small type of canoe sp.	< bɛ́	canoe sp.

2.7.1.5.3 ATR harmony

Vowel harmony requires that both vowels in the stem and in the affix(es) agree in terms of specific features determined by single languages phonological systems. In Igbo (cf. 3.3.1.2), Akan (cf. 3.3.6.3), Isu (cf. 3.3.5.2), Anyin (cf. 3.3.6.1), Oko (cf. 3.3.1.4) and Abidji (cf. 3.3.6.1), the RED always agrees in ATR feature with the stem.

In Anyin, a CIR Type IIIc language, the VRED always agrees in roundedness and ATR features with the V_1STEM (Bogny 2005: 13). The RED is C*i*- for unrounded, [+ATR], vowel stems (37a), C*ɪ*- for unrounded, [-ATR] vowel stems (37b), C*u*- for rounded, [+ATR], vowel stems (37c), and C*ʊ*- for rounded, [+ATR], vowel stems (37d).

(37) Anyin (Bogny 2005: 13f.): Function omitted in the source

a. [-ATR, -rounded] vowel stems

RedF	Gloss	verb	Gloss
kpì-kpɛ́		< kpɛ́	sleep
tɨ̀-tɨ́		< tɨ́	tear/pluck

b. [+ATR, -rounded] vowel stems

tì-té		< té	explode

c. [-ATR, +rounded] vowel stems

wʊ̀-wɔ̄		< wɔ́	sting/bite
nʊ̀̃-nʊ́̃		< nʊ́̃	drink

d. [+ATR, +rounded] vowel stems

wù-wú		< wú	die

2.7.1.5.4. Roundedness assimilation

In Isu, Igbo, Hyam of Nok, Kulango, Kutep, Ron, Nupe, Tarok, Ningye, Anyin, Attié, Abidji, Akan and the Abomey lect of Fon, the presence of any rounded vowel within a stem conditions the (default) VRED to assimilate roundedness, cf. (38). In the aforementioned languages, all rounded vowels are also back exception made from Attié which contrasts rounded vs. unrounded back vowels.

(38) a. Isu (Kießling 2012: 10f.): Intensified verbal adjectives

Default RED

RedF (Verb)	Gloss	Verb	Gloss
bɛ̂-ɔɛ́bə́	very bad	< bɛ́b	bad
fɪ̂-ʃíˈáa	very frightful	< *fiài*	frightful

Roundedness assimilation

kə́-sú-sɔ́ʔɔ́	termite	?? sɔʔɔ	
kə́-vú-vɔ́ŋɔ́	soldier ant	?? vɔŋɔ	

b. Akan (Akuapem) (Schachter & Fromkin 1968: 157f.): Pluractional

Default RED

RedF	Gloss	Verb	Gloss
si-seʔ	say several times	< seʔ	say
sɪ-sɛʔ	resemble many people	< sɛʔ	resemble

Roundedness assimilation

su-soʔ	seize several times	< soʔ	seize
sʊ-sɔʔ	light several times	< sɔʔ	light

c. Attié (Bogny 2005:17): Function omitted in the source

Default RED

RedF	Verb	Gloss
bī-bɤ̀	< bɤ̀	bake
bī-bʌ̀	< bʌ̀	come

Roundedness assimilation

bū-bò	< bò	shatter
bū-bɔ̀	< bɔ̄	germinate

2.7.1.6. Conflicting features in consonant onset + vowel

Taking into consideration the fact that in CIR Type IIIa, b, and $c_{(ii)}$ languages, the VRED phonetic quality is simultaneously conditioned by the quality of the C_1STEM and the VRED, one therefore wonders what happens in cases of conflicting features where both the C_1STEM and the VRED are assimilators, e.g: C*ju*, C*wi* vs. $C^{j}u$, $C^{w}i$ vs. $C_{[\alpha grave]}ju$, $C_{[\alpha grave]}wi$.

Consider the examples in (39) paying attention to the quality of the RED onset and nucleus.

39. a. C*ju*-, C*wi*-like languages

CIR Type III$c_{(ii)}$: Roundedness assimilation

Daffo [Ron] (Jungraithmayr 1970: 217): Lexical formation

RedF	Gloss	Source
kú-kwîʃ	flight	?? kwiʃ

Bokkos [Ron] (Jungraithmayr 1970: 143ff.): Lexical verbal adjectives (of color)

RedF	Gloss	Source
ʤī-ʤjūw	be red	?? ʤjuw

CIR Type IIIb: Place assimilation

Tarok (Blench & Longtau 2012: 2): Verb intensification

RedF	Source	
kú-kwí	< kwí	discuss secrets

b. $C_{[\alpha grave]}$*ju*-, $C_{[\alpha grave]}$*wi*-like languages

CIR Type III$c_{(ii)}$ (d): Roundedness assimilation

Ningye (Blench 2011a: 3ff.): Noun plurality

RedF	Gloss	Noun	Gloss
ʧu-ʧju	veins	< ʧju	vein
gi-gju	thieves	< gju	thief

c. C^{j}*u*-, C^{w}*i*-like languages

CIR Type III$a_{(ii)}$: Heigth assimilation

Ninzo (Blench 2011b: 6ff.): Lexical formation and plurality

RedF	Gloss	Noun	Gloss
ī-w^{j}ī-w^{j}írr (PL)	arrows	< ā-w^{j}írr	arrow
h^{w}ī-h^{w}īr	near	?? h^{w}ir	

A keen look at (39) reveals that the phonological status of the C*w*s and C*j*s coupled with the quality the primary articulator, i.e. the onset, play a great role in determing the VRED phonetic quality. For CIR Type IIIa/b/c languages with biphonemic C*w*s and C*j*s, the labio-velarized and palatal glides take precedence over the V_1STEM unlike its quality (39a). On the contrary, for CIR Type IIIa languages where C*w*s and C*j*s are monophonemic, the RED is identical to the stem-initial CV as the VRED is high (39c). For CIR Type III$c_{(ii)}$ with biphonemic

$C_{[\alpha grave]}j$s, $C_{[\alpha grave]}w$s the situation looks more complicated as grave consonants, labials allow labiality to span from the V_1STEM to the VRED whereas non-grave consonants, alveolars and palatals bock it (39b). Put differently, unlike in C*w*- and C*j*-like languages where the glides always take precedence over the stem high vowel, in $C_{[\alpha grave]}j$-, $C_{[\alpha grave]}w$-like languages rather, it is the quality of the primary articulator that may or may not trigger allomorphy. Thus, a labio-velarized coronal for example may not always constraint the VRED to agree in Backness and roundedness with the V_1STEM. likewise, a palatalized labial may not always turn VRED to [i] as it all depends on single languages phonological systems.

2.7.1.7. CIN reduplicant

So far, CI-reduplication has been characterized as being a grammatical process involving the copying of the C_1STEM followed by a high vowel whose phonetic quality is determined by the V_1STEM and/or the C_1STEM. Further more, it was stated previously that, the canonical formula of the RED is σC_0I-; and that, the consonant following the V_1STEM does not reduplicate generally. In Akan[15], however, the RED is CV[+high]N in shape (40a), if the consonant following the V_1STEM is a nasal; and CV[+high], if the stem ends in a non-nasal consonant (40b). Take note that the occurence of the nasal at the coda position of the RED nasalizes the preceding vowel. N stands for a homorganic nasal which agrees in [αplace] with the following consonant. The bracketed glottal stop represents a dialectal variant.

(40) Akan (Akuapem) (Schachter & Fromkin 1968: 159f.): Pluractional

	Lects	RedF	Gloss	Verb	Gloss
a.	Ak-As- Fa	fĩm-fɛmʔ	lend repeatedly	< fɛmʔ	lend
	Ak-As	tʊ̃ñ-tʊnʊ(ʔ)	forge repeatedly	< tʊnʊ(ʔ)	forge
	Fa	kĩŋ-kaŋʔ	count repeatedly	< kanʔ	count
b.	As-Fa[2]	hɪ-haʔ	trouble repeatedly	< haʔ	trouble
	Ak-As	bɪ-barɪ(ʔ)	cover repeatedly	< barɪ(ʔ)	cover
	Ak-As	hʊ-hʊrʊ(ʔ)	wash repeatedly	< hʊrʊ(ʔ)	wash

[15] Far from being an Akan idiosyncrasy, cases of CV reduplicant becoming CVN are mentioned in the literature, e.g. in Bemba (M42) (Kula 2002), a Narrow Bantou language of Zambia; and in Mbe, a Bantoid, Mbe language spoken in Nigeria (cf. Bamgbose 1971, Walker 1998, cited by Kirchner (2010: 14f.). Mbe, just to name the least, employs CV-reduplication to mark class 2 imperative non-continuous singular form. Mbe is a quantity-sensitive language that allows no coda in the RED except homorganic nasals. The RED is identical to the stem-initial CV if it comprises a high vowel, C*ə*- if it comprises a non/high vowel and CVN- if the stem-initial CV is followed by a nasal, e.g.: *gbə̂-gbârì* < *gbárì* 'embrace'; *rû-rû* < *rû* 'pull'; *bîm-bîem* < *bîem* 'believe'; *bə̂m-bámò* < *bámô* 'hide' (Kirchner 2010: 14).

2.7.1.8 CIR + suffixation

In very few languages, Daffo [Ron], Makaa, and Krumen, suffixes are used alongside with CI-reduplication. In Makaa, the adjunction of suffixes to reduplicatives helps in distinguishing different formal and functional categories. The unmarked CIR pattern in (41a), i.e. without affixes, is used for lexical creation. For diminutives, the suffix –ú is stray erased if the stem ends in a vowel; and its tone, left floating, docks backward (41b). Verbal adjectives occur with the HL formative suffix –î (41c).

41. Makaa (Ibirahim 2013: 277f.)

a. RED + Stem (Noun formation)

RedF	Gloss	Noun	Gloss
*zɨ́-*zàːmə́	leper	< zàːmə́	leprosy
kú-kúm	wealthy person	< kúm	wealth

b. RED + Stem + –ú (Diminutives)

*tʃɨ́-*ɪʃénd-ú	small change	< tʃénd	change
*lɨ̀-*ɨéɲá	small container	< lèɲà	container

c. RED + Stem + –î (Verbal adjectives)

kú-kùd-î	squatted	< kùdòw	squat
*fɨ́-*ʃəl-*î*	mixed	< fəlà	mix

In Krumen, suffixes are used for a morphophonological purpose whose raison d'être is unclear. Stems ending in a high vowel take the suffix *–E* which harmonizes in [ATR] with their nucleus (42b).

(42) Krumen (Marchese 1979: 101f.): Action nouns

a.

RedF	Gloss	Verb	Gloss
lí-lá	killing	< lá	kill
kí-kleˈ	catching	< kleˈ	catch

b.

*di-di-*eˈ	eating	< *di*	eat
kʊ́-kʊ́-ɛ́	dying	< kʊ́	die

Suffixes *-aj* and *-aʃ* coupled with CIR in Daffo [Ron] are frozen plural determiners (Wolff 2008: 15). Generally, reduplicatives have the structure RED + Stem. Some reduplicatives designating some body parts and some human nouns have the structure RED + Stem + *-aj* and RED + Stem + *-aʃ* respectively.

(43) Daffo [Ron] (Seibert 1998: 24f.): Noun plurality

a. RED + Root

RedF	Gloss	Noun	Gloss
fi-faɗê	ribs	< faɗê	rib
ku-kῡ̂n	lamb	< kῡ̂n	lamb

b. RED + Root + -aj

fù-fúr-aj	legs	< fùr	leg
tu-tw-áj	bellies	< tu	belly

c. RED + Root + -aʃ

kì-kàj-aʃ	grandmothers	< káj	grandmother

2.7.1.9 Tone in CIR systems

Drawing generalizations on tonal processes in CIR systems may prove premature as the results would seem highly dubious, since the rudimentary status of the documentation of most languages does not allow for disentangling the lexical tonal properties from inflectional tones (Roland Kießling, pc). Nevertheless, some generalizations worth mentioning could be made based on some primary sources' analyses of tonal processes in reduplicatives – e.g.: Yoruba (Pulleyblank 1988), Emai (Ola 1995), Fyam (Nettle 1998), Vengo (Schaub 1985), Fe'fe' (Sadembouo 2013), Akan (Schachter & Frankin 1968), Fon, Abomey lect (Akoha 2010), Makaa (Ibirahim, 2009, 2013) – and on previous reference studies of tone (non-) transfer in African languages (Inkelas & Zoll 2005; Downing 2001, 2003, 2005, Ibirahim forthcoming, among others). Based thus on the aforementioned sources, and on the brief surveys of tonal processes as displayed in case studies, in Chapter three, it appears that there are three important sources of the RED tone in CIR systems, namely: (a) the possibility for the RED to bear a tone copied from the base (cf. Pattern 1), (b) the possibility for the RED to bear a context-sensitive tone (cf. Pattern 2); and (c) the possibility for the RED, like any other affix, to bear a tone on its own independent of the stem stone (cf. Pattern 3).

2.7.1.9.1 Pattern 1: Languages where the RED preserves the stem lexical tone

In Igbo (cf. 3.3.1.2), Tarok (pronoun, verb intensification, adverb) (cf. 3.3.2.5), and Kutep (cf. 3.3.3), the RED and the stem bear a similar tone as the stem tonal melody (TSTEM) is transferred. Illustration in (44) is from Igbo.

(44) Igbo (Ihiunu & Kenstowicz 1994: 2): Action noun

RedF	Gloss	Verb	Gloss
sì-sè	stirring	< í-sè	stir (water)
zì-zɔ̀	trampling	< *í*-zɔ̀	trample
zʊ́-zʊ́	buying	< *í*-ˡ*zʊ́*	buy
pʰ*í*-pʰ*í*	whittling	< *í*-ˡ*p*ʰ*í*	whittle

2.7.1.9.2 Pattern 2: Languages where the RED tone varies according to the context.

In Attié (cf. 3.3.6.2), Tarok (Adjective of taste) (cf. 3.3.2.5), Vengo (cf. 3.3.5.1), Fon (Abomey lect) (cf. 3.3.6.4), and Makaa (diminutives and lexical formation) (cf. 3.3.5.4), the RED tonal melody (TRED) is sensitive to the context. In Attié, for H(igh) (45a) and M(id) (46b) tone stems, the RED bears a similar tone, and both stems original tones turn to L. For L(ow) tone stems, the RED bears a M and the stems L remains unchanged (46c).

(45) Attié (Bogny 2005:17): Function omitted in the source

a. High tone stems

RedF	Verb	Gloss
bú-bù	< bú	break
bí-bì	< bí	blacken

b. Low tone stems

lī-là	< lā	sleep
mī-mjà	< mja̰	be in a spot

c. Mid tone stems

bū-bò	< bò	shatter
bī-bɤ̀	< bɤ̀	Bake

2.7.1.9.3 Pattern 3: Languages with a fixed tone RED

In some languages, the RED has a fixed-tone. Four different tonal patterns were identified.

- H Yoruba (cf. 3.3.1.1), Makaa (verbal adjectives), Emai (cf. 3.3.1.1), Fyam (cf. 3.3.2.4), Nupe (cf. 3.3.1.3)
- ↓H Vengo (cf. 3.3.5.1)
- M Nupe (cf. 3.3.1.3), Kulango (cf. 3.3.8)
- L Anyin (cf. 3.3.6.1), Tarok (feminine gender noun) (cf. 3.3.2.5), Akan (cf. 3.3.6.3), Fon (cf. 3.3.6.4) (not in the Abomey lect)

(46) a. RED with a fixed H

Nupe (Kandybowicz 2004: 76): Action nouns

RedF	Gloss	Verb	Gloss
ò-sí-sīē	doing	< sīē	do
ò-sí-sū	marrying	< sú	marry
ò-fú-fūrū	jumping	< fùrū	jump

b. RED with a fixed M

Kulango, Bouna (Bogny 2005: 15f.): Function omitted in the source

ɓʊ̃-ɓlú	< ɓlú	share/divide
ʃĩ-ʃā	< ʃā	smatch/grind
fʊ̃-fɔ̄	< fɔ̀	roast

c. RED with a fixed L

Anyin (Bogny 2005: 13f.): Function omitted in the source

kpì-kpɛ́	< kpɛ́	cut
nʊ̀̃-nʊ́̃	< nʊ́̃	drink
wù-wú	< wú	die

Some languages, e.g: Makaa (cf. 3.3.5.5), Vengo (cf. 3.3.5.1), and Tarok (cf. 3.3.2.5) use the aforementioned tonal patterns or at least two of them to mark distinct functions of CI-reduplication. In Tarok for example, the RED bears a tone similar to that of the stem within

emphatic verbs (47a); its tone alternates within verbal adjectives (47b), and it bears an unvariably L within nouns drawn from female's language (47c).

(47) a. Tarok (Blench & Longtau 2012: 2): Verb intensification

Example of the RED preserving the stem lexical tone

RedF	Verb	Gloss
kú-kwí	< kwí	discuss secrets
dī-dīŋ	< dīŋ	sprout
lì-là	< là	speak

b. Example of the RED with tone alternation

Tarok (Blench & Longtau 2012: 4): Verbal adjectives

ā níŋ mú-mwán
3SG smell RED-be off
'it smells 'off' (but not so bad that it can not be eaten)'

ā níŋ sī-sám
3SG smell RED-be sour
'it smells sour (fermented)

c. Example of the RED with a fixed low tone

Tarok (Longtau & Blench 2012: 10): Noun from female's language

ì-zù-zwà	< ì-zwà	snake
ì-gù-gór	< ì-gór	bag

2.7.2 Functional characteristics and subtypes

Reduplication is productively and unproductively used in 27 Niger-Congo, and 2 West Chadic languages to assume a wide variety of functions ranging over the standard morphological functions of derivation vs inflection (cf. Jungraithmayr 1970, Hyman 1972, 1973, Faraclas & Williamson 1984, Downing 2006, Kießling 2012, Ibirahim 2009, 2013, Heath 2003, Blench 2011a/b/c, Ihiunu & Kenstowicz 1994, just to name the few).

A priori, there is no reason to assume that reduplication is restricted to certain functions (cf. Moravcsik 1978: 316). Put differently, reduplicating affixes serve the same functions that any affix with its own phonological form can serve, including all derivational and inflectional functions (Wiltshire & Marantz 2000: 560f.). Following the same line of argumentation, Moravcsik (2013: 129, 131) notes that:

> […] In western languages, reduplication generally involves emphasis or increased quality, as in very very and old old. This is also common meaning of partial reduplication across languages […] But duplifixes can have other meanings as well. The semantic contributions that they make to the base fit into two broad types: Plurality of entities, continuation of action, or intensification of properties on the one hand, and diminution of entities or attenuation of properties on the other hand […] The cross-linguistically most common meaning of reduplication is the quantitative or qualitative augmentation of the meaning of the base. Its second meaning is the diminution of the size or entity.

The categorization of CI-reduplication semantic functions as outlined within this thesis is in total agreement with Moravcsik 2013. Cross-linguistically, it is observed that CI-reduplication is used mostly to mark two major semantic patterns: quantitative and qualitative augmentation and/or diminution. No case of decreased quantity was found so far.

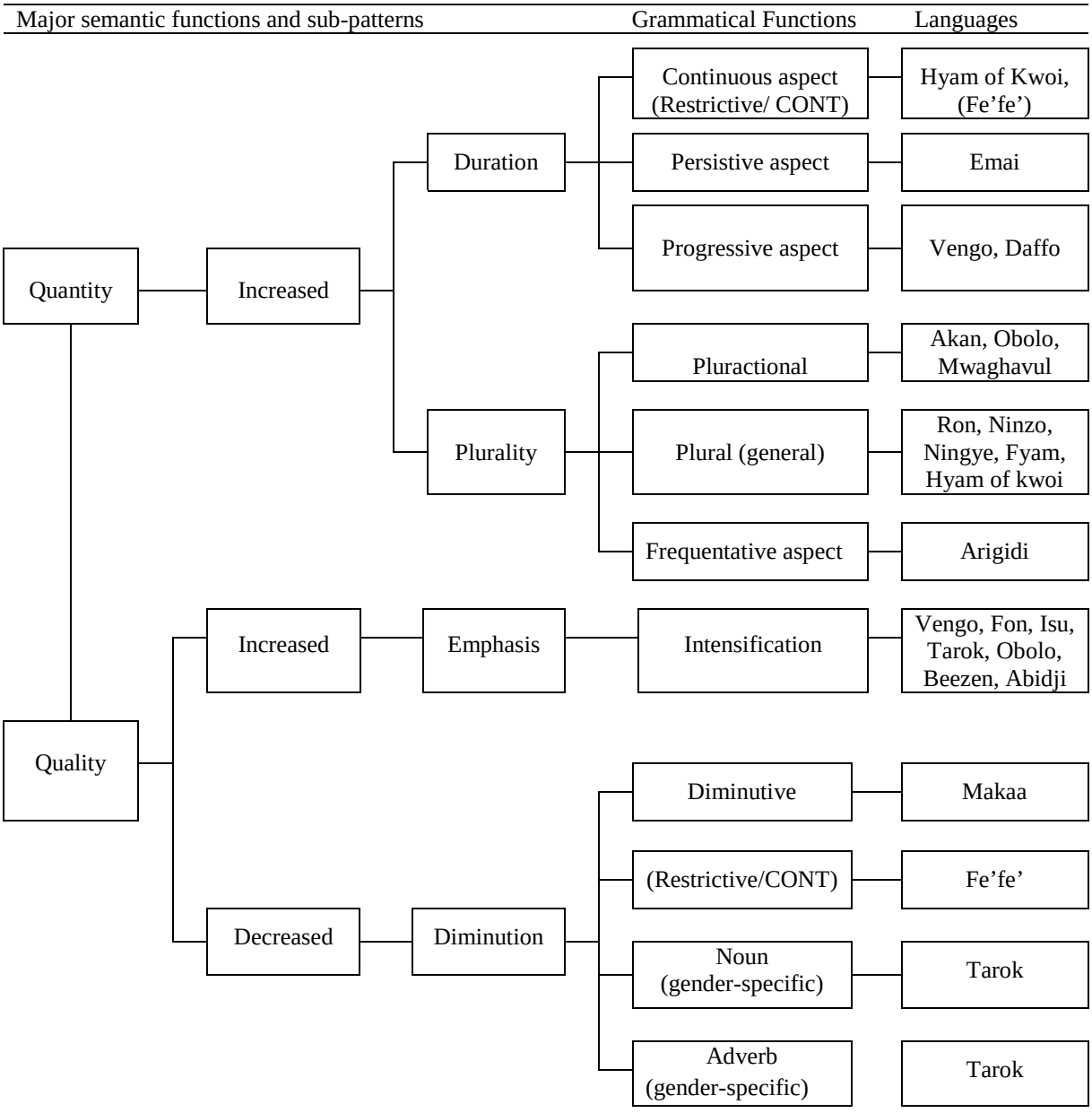
Though reduplication functions in the morphology just like other forms of affixation, it has been shown across languages that the quantitative and qualitative functions fulfilled by reduplication are iconic since the repetition of phonological material indicates either increase or decrease in the denotation (Moravcsik 1978, Wiltshire & Marantz 2000, Mattes 2007). Besides the meanings of increased and/or decrease of quantity or quality, CI-reduplication also marks grammatical functions without apparent iconic meaning.

2.7.2.1. Functions of CI-reduplication with iconic motivation

Every reduplicative which expresses any kind of quantity (plurality, duration) or quality (diminution, intensity) change is a clear case of iconicity[16] in that, the change of quantity or quality in form corresponds to a change of quantity or quality in meaning. The most recurrent functions of CI-reduplication with iconic motivation are expressed by increased quantity and the constrast increased vs. decreased quality (cf. Table 2.2).

[16]This description is a slightly modified version on Mattes (2007: 75f.) definition of iconicity.

Table 2.3. Functions of CIR with iconic motivation



2.7.2.1.1 Increased quantity

Increased quantity refers to cases where reduplication is used to mark addition of quantity, entities or performance. It also refers to actions performed repeatedly or within a long period of time by one or several participants.

The semantic link between the reduplicated form and the stem is that of inclusion plus addition of supplementary information. Across languages, increased quantity is marked by two basic functions, namely, duration (continuous/restrictive, progressive, and persistive aspects) and plurality (subsuming plural and pluractional, cf. Table 2.2). Consider the examples in (48).

(48) Fe'fe' (Hyman 1973: 333f.): Restrictive/Continuous aspect

RedF	Gloss	Verb	Gloss
ʧī-ʧɛ̄n	moan only and continuously	< ʧɛ̄n	moan
tī-tā*ʔ*	bargain only and continuously	< tā*ʔ*	bargain
jī-jē:	remove only and continuously	< jē:	remove
ʧī-ʧɥɛ̄:*ʔ*	copulate only and continuously	< ʧɥɛ̄:*ʔ*	copulate

Reduplicated verbs in Fe'fe' pose a problem regarding their semantic categorization because they express restriction and continuity simultaneously. On the one hand, verbs in (48) describe situations in the course of which agents restrict theirselves to the accomplishment of particular events only. On the other hand, the same verbs also denote continuity because agents keep performing the restricted event continuously or repeatedly to a point that it becomes monotonous (Sadembouo 2012: 170). Verb reduplication in Fe'fe', as in some Eastern Grassfields[17] languages, is mostly used within jugedments reprimanding people considered as lazy, doing nothing worthier of their time except the event expressed by the verb they keep performing over and over (Hector Kamdem, Gabriel Djomeni, pc). This jugement is not always shared by the participant himself who mostly finds pleasure in what he is doing. Regarding their semantic complexity, CI-reduplicated verbs in Fe'fe' have been ranged under both increased quantity and decreased quality (cf. Table 2.2). They express increased quantity as the core function, continuity, signalizes quantitative increase by way of concentration, i..e. actions or events spanning over a long period of time.

Another issue for concern in relation to functional subcategorization comes from Obolo. Reduplicated verb stems mark simultaneously plurality (pluractional) and intensification. With respect to this double marking, Obolo has being classified under both increased quantity for the pluractional function and increased quality for the intensification function.

Duration is expressed by reduplicating verbs; and plurality by reduplicating nouns, adjectives, adverbs, and verbs. Duration refers to ongoing actions regardless of the beginning or the moment of completion; and it is marked by continuous aspect (Hyam of Kwoi) (49a), progressive aspect (Vengo) (49b), and persistive aspect (Emai) (49c).

[17] Totally reduplicated verbs fulfil the same function in Ngiemboon, Ghomala', Yemba.

(49) a. Hyam of Kwoi (Gerhardt 1988: 53ff.): Continuous aspect

RedF	Gloss	Verb	Gloss
kpí-kpé	do continuously	< kpé	do
ɣí-ɣí	eat continuously	< *ɣí*	eat
dí-dúrə́	search continuously	< dúrə́	dearch

b. Vengo (Schaub 1985: 353f.): Progressive aspect

RedF	Gloss	Verb	Gloss
ˈ*bí*-ˈbwéy	be sleeping	< ˈbwéy	slept
ˈ*sí*-ˈsáŋ wé:	be beating a child	< ˈsáŋ wé:	beat a child
ˈ*bí*-bwêy	be living	< bwêy	lived
ˈ*ní*-ɲəʔˈnə́	be shaking	< *nəʔnə̀*	shaken

c. Emai (Egbokhare 1990 cited by Ola-Orie 1997: 80): Persistive aspect

RedF	Gloss	Verb	Gloss
tí-tà	still say	< tà	say
gbí-gbè	still beat	< gbè	beat
dí-dà	still betray	< dà	betray

Plurality refers to the state or fact of being plural (Stevenson 2010: 1367), i.e. more than one. It includes general plural marking, pluractional, and frequentative. Nouns reduplicate in Ron [Fyer, Kulere, Bokkos, Daffo] (cf. 3.2), Fyam (cf. 3.3.2.4), Ninzo (cf. 3.3.2.2), and Ningye (cf. 3.3.2.1) (50a); adjectives in Ninzo (cf. 3.3.2.2), and Fyer [Ron] (50b); and adverbs in Daffo [Ron] (50c), to mark plurality. Nouns also reduplicate in Hyam of Kwoi to mark distributive plural (50d).

(50) a. Kulere [Ron] (Jungraithmayr 1990: 306f.): Noun plural

RedF	Gloss	Noun	Gloss
wù-wàr	he-goats	< wàr	he-goat
gū-gwāt	hills	< gōt	hill
bí-bjél	tails	< bjêl	tail
dī-djèn	houses	< djèn	house

b. Ninzo (Hoerner 1980: 49): Adjective pluralization

RedF	Noun	Gloss
mi-tsí-tsà	< vá-tsaˈ	little
á-ŋkpí-ŋkpí	< ù-ŋkpì	big

c. Daffo [Ron] (Jungraithmayr 1970: 170): Adverb[18] plurality

RedF	verb	Gloss
vī-vāːt	< vāːt	small/ a little

d. Hyam (Gerhardt 1988: 53ff.): Distributive plural

RedF	Gloss	Noun	Gloss
ʧī-ɲʧāː	houses of different people	< ʧāː	house
ɲì-ɲí	mouths of different people	< ɲí	mouth
ʧí-ʧép	speeches from different people	< ʧép	speech
ʃú-ʃú	faces of different people	< ʃú	face
ʧwù-ʧwēky	noses of different people	< *ʧwēkȳ*	nose

Verbs reduplicate in Akan (cf. 3.3.6.3), Obolo (cf. 3.3.4), and Mwaghavul (cf. 3.2) to mark pluractional (51).

(51) Mwaghavul (Blench 2011b: 56): Pluractional/Intensification

RedF	verb	Gloss
kwù-kwéːk	< kwéːk	sit
kì-kékê	< kékê	stand up
tì-tíːŋ	< tĭːŋ	gather
bù-báːŋ	< báːŋ	spread

Frequentative aspect refers to events performed repeatedly or frequently by one or many participants. it expresses increased quantity because its primary emphasis lies on the repetition of events during a period of time.

(52) Arigidi (Ola-Orie 1997: 55): Frequentative aspect

RedF	Gloss	verb	Gloss
kpì-kpɛ́ː	dig anyhow	< kpɛ́ː	dig
kì-kóː	sing anyhow	< kóː	sing
ʤì-ʤɛ́ː	dance anyhow	< ʤɛ́ː	dance

[18] The entry in (50c) is the only example identified so far.

2.7.2.1.2 Increased/decreased quality

Increased/decreased quality refers to cases where CI-reduplication is used to add more prominence or quality to the stem; or decrease, substract or attenuate some from it. The semantic link between the reduplicative and the stem is that of inclusion plus addition or substraction of information related to any qualifying feature in general, i.e. shape, size, judgements or appreciations. Across languages, increased/decreased quality is marked by two basic functions, namely, intensification (of verbs, verbal adjectives and pronouns); and diminution (diminutives, restrictive/continuous aspect, and nouns from a female's language register). Intensification is ranged under increased of quality and diminution under decreased of quality.

(i) Increased quality

Verbs in Fon (cf. 3.3.6.4), Beezen (cf. 3.3.3), Tarok (cf. 3.3.2.5), Abidji (cf. 3.3.6.1), Obolo (cf. 3.3.4) and Vengo (cf. 3.3.5.1) (53a); demonstrative pronouns in Obolo (53b); and verbal adjectives in Isu (cf. 3.3.5.2) (53c) undergo CI-reduplication to express intensification.

(53) a. Fon (Akoha 2010: 70): Verb intensification

RedF	Verb	Gloss
gbɛ̀̃-gbɔ̃	< gbɔ̃	suck
tű-tű	< tű	loosen
fű-fű	< fű	scatter
vù̃-vű	< vũ̀	shred

b. Obolo (Rowland-Oke 2003: 305f.): Intensified demonstrative pronouns

é↓ʧí-ʧí	< é↓ʧí	these ones
é↓bí-bí	< é↓bí	they, them
é↓ʤí-ʤí	< é↓ʤí	this one

c. Isu (Kießling 2012: 10f.): Intensive verbal adjectives

RedF	IPF verbal form	Gloss	Source	Gloss
bû-buí	-	be soft	< búi	soft
dɛ̂-díjɛ̀	-	be huge	< dìjɛ̀	huge
zʊ̂-zʊ́mə́	zʊ́mə́	be dry	< zʊ́m	dry
dzɛ̂-dzə́ə	dzə́ə	be dirty	< dzɛ́	dirty

(ii) Decreased quality

As stated previously, besides the meaning of increased quality, CI-reduplication is also used to express decreased quality. Decreased quality is primarily used to mark diminution in CIR languages: diminutives, restrictive/Continuous aspect, and feminine gender nouns and adverbs. Nouns undergo CIR in Makaa to form diminutives.

(54) Makaa (Ibirahim 2013: 278ff.): Diminutives

RedF	Gloss	Noun	Gloss
ʃì-ʃílə́	small girl	< ʃìlə̀	girl
mpí-mpǐ	small pot	< *mpǐ*	pot
lɨ̀-lə́ŋá	small container	< lə̀ŋà	container
bú-bwə́nʒá	small tree species	< bwə̀nʒà	tree species

Verbs reduplicate in Fe'fe' to express restriction (55). The Fe'fe' restrictive/continuous aspect expresses decreased quality as in a certain context, the fact that the participant restricts himself to the accomplishment of a particular event he keeps perfoming continuously makes the event boring, monotonous; decreasing therefore the appreciation the speaker has towards him and/or the act he/she performs (cf. § 2.7.2.1.1).

(55) Fe'fe' (Hyman 1973: 333f.): Restrictive/Continuous aspect

RedF	Gloss	Verb	Gloss
ʧī-ʧɛ̄n	moan only and continuously	< ʧɛ̄n	moan
tī-tāʔ	bargain only and continuously	< tāʔ	bargain
jī-jē:	remove only and continuously	< jē:	remove
ʧī-ʧwɛ̄ːʔ	copulate only and continuously	< ʧwɛ̄ːʔ	copulate

Tarok derives nouns and adverbs specific to the female's language (as opposed to non-reduplicated forms belonging to the men's language) via CI-reduplication. Nouns (56a) and adverbs (56b) drawn from the female's language are ranged under decreased quality because they belong to a social marker in the Tarok society, language, delineating social and gender subgroups (Longtau & Blench 2012: 4). Talking like a female thus sounds pejorative in the sense that it downgrades one to the point of being assimilated to the group made up of women (with children included) as opposed to the one comprised of men who, culturally and traditionally, in many African societies, are considered superior.

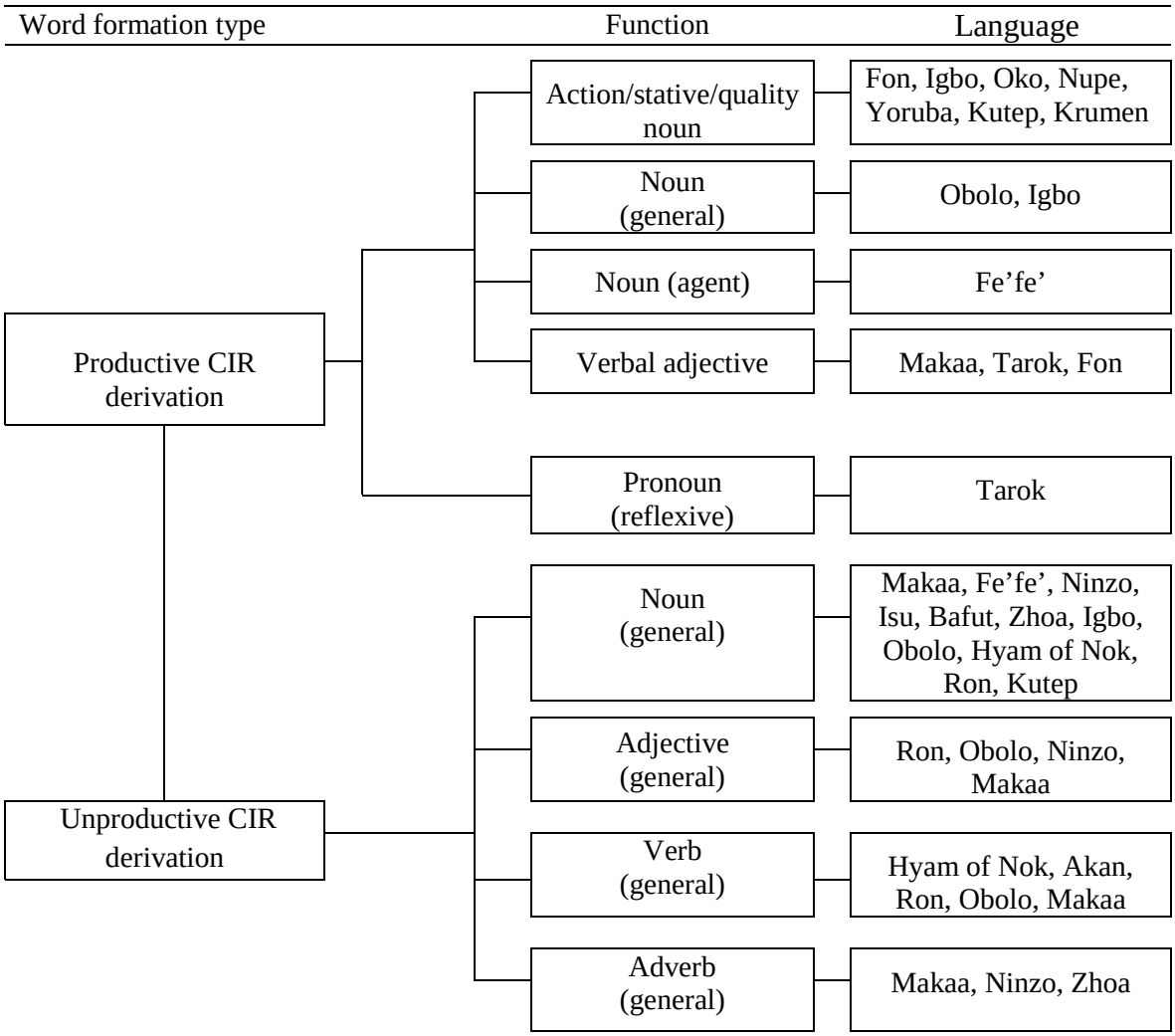
(56) Tarok (Longtau & Blench 2012: 10): Nouns/adverb from female's language

	RedF	Noun/Adverb	Gloss
a.	ì-zù-zwà	< ì-zwà	snake
	ì-zù-zùl	< ì-zùl	chaff
	ā-kù-kwà	< ā-kwà	straw
	ì-gù-gór	< ì-gór	bag
b.	kə̀ ɗí-ɗí	< kə̀ ɗĭ	again

2.7.2.2 Function of CI-reduplication without iconic motivation

In addition to the functions of CI-reduplication surveyed in the preceding section, there is equally a disparate set of words derived via CI-reduplication across languages without any apparent iconic meaning, cf. Table 2.3, and (57-58) for illustrations.

Table 2.4. Functions of CIR without iconic motivation



Action/quality/stative nouns (referred to in the literature as gerunds) are derived from verbs in Fon (cf. 3.3.6.4), Kutep (cf. 3.3.3), Yoruba (cf. 3.3.1.1), Igbo (cf. 3.3.1.2), Nupe (cf. 3.3.1.3), Oko (cf. 3.3.1.4) and Krumen (cf. 3.3.7) (57a); verbal adjectives from verbs in Makaa (cf. 3.3.5.5), Tarok (cf. 3.3.2.5) and Fon (57b); nouns (general) from verbs in Igbo (cf. 3.3.1.2), and Obolo (cf. 3.3.4) (57c); the 3SG reflexive pronoun from the noun meaning *ī-ʃí* 'head' in Tarok (57d); and agent nouns from verbs in Fe'fe' (cf. 3.3.5.3) (57e).

(57) a. Krumen (Marchese 1979: 101): Action nouns

RedF	Gloss	Verb	Gloss
lí-lá	killing	< lá	kill
wu̱-we̱	crying	< wū	cry
kí-kle̱	catching	< kle̱	catch
gbʊ́-gblá	sewing	< gblá	sew

b. Makaa (Ibirahim 2013: 278): Adjectives of state

RedF	Gloss	Verb	Gloss
mbú-mbùd-î	lain	< búdòw	lie on one's face
kú-kùd-î	squatted	< kùdòw	squat
fɨ́-ɟəl-ɨ̂	mixed	< fəlà	mix
fú-*fùgɨ̀l-î*	chewed	< fúgàl	chew

c. Obolo (Faraclas 1983: 5): Nouns (general)

RedF	Gloss	Verb	Gloss
ń-g^{w}ù-gwá	sacrifice	< g^{w}á	sacrifice
ḿ-bú-bót	earth	< bót	mound
ń-rí-róm	divination	< róm	make a charm

d. Tarok (Longtau 2008: 130): 3SG reflexive pronoun

RedF	Noun	Gloss
ī-ʃí-ʃí	< ī-ʃí	head

e. Fe'fe' (Sadembouo 2012: 170f.): Agent nouns

RedF	Gloss	Verb	Gloss
ǹ-zɨ̄-ɀâ	one who eats only and constinuously	< n-zâ	eat
m̀-bū-pŭ	one who makes only and constinuously	< m-bû	make
m̀-b^{h}ì-p^{h}ì	one who sows only and constinuously	< m-b^{h}ì	sow

Besides the productive word derivation illustrated in (57), there do exist an important number of lexemes derived via CIR whose presupposed source stems are not related, synchronically, to any known lexical word. These includes nouns (58a) in Makaa (cf. 3.3.5.5), Fe'fe' (cf. 3.3.5.3), Bafut (cf. 3.3.5.4), Isu (cf. 3.3.5.2), Zhoa (cf. 3.3.5.2), Igbo (cf. 3.3.1.2), Kutep (cf. 3.3.3), Ninzo (cf. 3.3.2.2), Hyam of Nok (cf. 3.3.2.3), Obolo (cf. 3.3.4), and Ron (cf. 3.2); adjectives (58b) in Makaa, Ron, Obolo, and Ninzo; verbs (58c) in Hyam of Nok, Akan (cf. 3.3.6.3), Ron, Obolo, and Makaa; and adverbs (58d) in Makaa, Ninzo, and Zhoa.

(58) a. Ninzo (Blench 2011a: 6ff.): Fossilized Nouns

RedF	Gloss	Simplex
ì-ŋgbū-ŋgbúɽ	world	?? ŋgbuɽ
ā-ʧī-ʧì	forehead	?? ʧi
ī-gbī-gbjâr	throat	?? gbjar
ú-ŋgbú-ŋgbá	ensete [sic]	?? ŋgba

b. Obolo (Rowland-Oke 2003: 181): Fossilized adjectives (color)

RedF	Gloss	Simplex
ó-kú-két	white	?? -ket
ó-fí-fít	black	?? -fit
ǹ-ʤí-ʤòːŋ	fresh, alive	?? -ʤoːŋ
m̀-kpú-kpèm	green	?? -kpem

c. Akan (Schachter & Fromkin 1968: 159ff.): Fossilized verbs

RedF	Gloss	Simplex
fwu-fwæwʔ	chip	?? fwæ(w)ʔ
gwu-gwæʔ	skin	?? gwæʔ
hw̃ũ-hw̃æ̃ʔ	scrape	?? hw̃æ̃ʔ
kwʊ-kwawʔ	rub off	?? kwa(w)ʔ

d. Makaa (Ibirahim 2013: 278): Adverbs

RedF	Gloss	Simplex	Gloss
tɨ́-ɪ́ám	in the midst	< tâm (ADV.)	midst
kù-kúg	suddenly	< kúg (N)	miracle
tɨ́-ɪ́ògú	slowly, softly	?? togu	
fĭ-fâl	speedily	?? fal	

2.7.3 Correlation between form and function

As seen in the preceding sections, CI-reduplication has different forms sub-categorized under CIR Types I, II and III and a multitude of semantic patterns range under increased and/or decreased quantity or quality. The aim in this section is twofold. It investigates (a) how the CIR forms in 2.7.1 are distributed over functional categories in 2.7.2, and inversely, (b) how these functional categories are distributed over formal types.

A first generalization about CIR formal types is that all of them mark more than one function across languages as shown in Table 2.4.

Table 2.5: Range of functions expressed by different formal types of CIR

Form	Function	Language	Language Filiation
Type Ia	Duration (persistive aspect)	Emai	West Benue-Congo
	Plurality (frequentative aspect)	Arigidi	
Type Ib	Emphasis (verb intensification)	Vengo	Bantoid, Ring
	Duration (progressive aspect)		
	Lexical creation (noun)	Bafut	Bantoid, Ngemba
Type IIa	Lexical creation		
	- action/stative noun	Yoruba, Fon	WBC, Kwa
	- verbal adjective (general)	Fon	Kwa
	Emphasis (verb intensification)	Fon (Abomey lect)	
Type IIb	Lexical creation		
	- action/stative noun	Oko	West Benue-Congo
	Duration (continuous aspect)	Hyam of Kwoi	Plateau
	Plurality (distributive plural)		
Type IIIa	Duration		
	- restrictive/continuous aspect	Fe'fe'	Bantoid, Bamileke
	Plurality		
	- noun	Fyam, Ninzo	Plateau
	- adjective	Ninzo	Plateau
	- pluractional	Akan, Obolo	Kwa, Cross River
	Emphasis (pronoun intensification)	Obolo	Cross River
	Diminution		
	- diminutive	Makaa	Bantoid, Narrow B.
	- Restrictive/Continuous aspect	Fe'fe'	Bantoid, Bamileke

	Lexical creation - action/stative noun - noun (general) - agent noun - pur adjective (general) - verb (general) - Adverb (general) - Verbal adjective	 Igbo; Krumen Igbo; Fe'fe', Makaa; Ninzo, Obolo Fe'fe' Makaa, Fe'fe'; Ninzo; Obolo Makaa; Obolo Makaa; Ninzo Makaa	 West Benue-Congo, Kru WBC[19]; Bantoid; Plateau; Cross River Bantoid, Bamileke Bantoid; Plateau; Cross River Bantoid; Cross River Bantoid; Plateau Bantoid

Form	Function	Language	Language Filiation
Type IIIb	Emphasis (verb intensification) Diminution (gender-specific words: noun and adverb) Lexical creation - 3SG reflexive pronoun - adjective (describing odours) - action/stative noun - noun (general) - adverb	Tarok Tarok Kutep	Plateau Plateau Jukunoid
Type IIIc	Duration (progressive aspect) Plurality - noun - adjective - adverb - pluractional Emphasis (intensification) - verb - verbal adjective Lexical creation - action/stative noun - pur adjective - noun (general) - verb (general)	Daffo [Ron] Ningye, Hyam of Nok Ron Fyer [Ron] Daffo [Ron] Akan Abidji Isu Nupe Ron Isu; Ron Akan, Ron Hyam of Nok	West Chadic Plateau, West Chadic West Chadic West Chadic Kwa Kwa Bantoid, Ring West Benue-Congo West Chadic Bantoid, Ring; WC Kwa, West Chadic Plateau
Unclassified	Emphasis (verb intensification) Plurality (pluractional) Lexical creation - adverb - noun (general)	Beezen Mwaghavul Zhoa	Jukunoid West Chadic Bantoid, Ring

Inversely, the CI-reduplication semantic categories in 2.7.2 are also marked by more than one formal type in 2.7.1, cf. Table 2.5.

[19] WBC = West Benue-Congo, and WC = West Chadic, CR = Cross River

Table 2.6: Range of formal types expressing different CIR functional categories

A- Increased quantity (duration and plurality) is marked by CIR Types Ia/b, IIb, IIIa/c			
Function Pattern	Form	Language	Language Filiation
1. Duration			
(i) persistive	Type Ia	Emai	West Benue-Congo
(ii) progressive	Type Ib	Vengo	Bantoid, Ring
	Type IIIc	Daffo [Ron]	West Chadic
(iii) continuous aspect	Type IIb	Hyam of Kwoi	Plateau
(iv) REST/CONT aspect	Type IIIa	Fe'fe'	Bantoid, Bamileke
2. Plurality			
(i) Pluractional	Type IIIc	Akan	Kwa
	Type IIIa	Obolo	Cross River
	not classified	Mwaghavul	West Chadic
(ii) Plural (general)			
- distributive	Type IIb	Hyam of Kwoi	Plateau
- adjective	Type IIIc	Fyer [Ron]	West Chadic
		Ninzo	Plateau
- noun	Type IIIc	Ron	West Benue-Congo
		Fyam	Plateau
		Ninzo	
	Type IIIc	Ningye	
- adverb	Type IIIc	Daffo [Ron]	West Chadic
(iii) Frequentative	Type Ia	Arigidi	West Benue-Congo

B- Increased quality (emphasis/intensification) is marked by CIR Types Ib, IIIa/b/c			
Function Pattern	Form	Language	Language Filiation
Emphasis (intensification)			
- verb	Type Ib	Vengo	Bantoid, Ring
	Type IIIa	Obolo	Cross River
	Type IIIb	Tarok	Plateau
	Type IIIc	Fon (abomey)	Kwa
		Abidji	
	not classified	Beezen	Jukunoid
- pronoun	Type IIIa	Obolo	Cross River
- verbal adjective	Type IIIc	Isu	Bantoid, Ring

C- Decreased quality (diminution) is marked by CIR Types IIIa/b

Function Pattern	Form	Language	Language Filiation
Diminution			
(i) diminutive	Type IIIa	Makaa	Bantoid, Narrow B.
(ii) restrictive/continuous		Fe'fe'	Bantoid, Bamileke
(iii) feminine gender noun	Type IIIb	Tarok	Plateau
(iv) feminine gender adverb			

D- Lexical creation is marked by CIR Types Ib, IIa/b, IIIa/b/c

Function Pattern	Form	Language	Language Filiation
1. Noun			
- action/stative noun	Type IIa	Yoruba	West Benue-Congo
	Type IIb	Oko	
	Type IIIa	Igbo	West Benue-Congo
		Krumen	Kru
	Type IIIb	Kutep	Jukunoid
	Type IIIc	Fon (≠Abomey)	Kwa
		Nupe	West Benue-Congo
- noun (people/thing/object)	Type Ib	Bafut	Bantoid, Ngemba
	Type IIIc	Hyam (Nok)	Plateau
	Type IIIa	Ninzo, Ron	Plateau, WC
		Makaa	Bantoid, Narrow B.
		Obolo	Cross River
		Fe'fe'	Bantoid, Bamileke
	Type IIIb	Kutep	Jukunoid
	Type IIIc	Isu	Bantoid, Ring
	Type IIIc	Igbo	West Benue-Congo
	not classified	Zhoa	Bantoid, Ring
- agent noun	Type IIIc	Fe'fe'	Bantoid, Bamileke
2. Verb (general)	Type IIIc	Hyam of Nok	Plateau
	Type IIIc	Ron	West Chadic
		Makaa	Bantoid, Narrow B.
		Obolo	Cross River
	Type IIIc	Akan	Kwa
3. Verbal adjective	Type IIIa	Makaa	Bantoid, Narrow B.
	Type IIIb	Tarok	Plateau
	Type IIIc	Fon (≠Abomey)	Kwa

4. Pure adjective (general)	Type IIIa	Makaa	Bantoid, Narrow B.
	Type IIIc	Ron	West Chadic
		Ninzo	Plateau
		Obolo	Cross River
5. Adverb (general)	Type IIIa	Makaa	Bantoid, Narrow B.
		Ninzo	Plateau
	not classified	Zhoa	Bantoid, Ring
6. Pronoun (3SG reflexive)	Type IIIb	Tarok	Plateau

The resolution for the distribution of formal types across functions in Tables 2.4 and 2.5 is too much high for drawing any conclusions or generalizations from it.

2.7.4. Geographical distribution of types in term of form and function

So far, the formal and functional properties of reduplicatives have been at the center of debates. Yet, another interesting question that begs a close attention is how the paradigms form-meaning discussed in the preceding sections are distributed over areas and language families.

CI-reduplication is attested solely in West Africa. It is found in a comsiderable variety of languages belonging to the Niger-Congo language family and the West Chadic branch of the Afroasiatic language family (cf. Table 2.6). These languages are spoken in Côte d'Ivoire, Ghana, Togo, Benin, Nigeria and Cameroon. The countries are listed from South to East.

Côte d'ivoire counts 5 languages belonging to 3 branches of Niger-Congo:

- Krumen Tépo, a Kru language, isolated in the Southwest.
- A cluster of 3 Kwa languages, Anyin, Abidji and Attié in the East.
- A Gur language, Kulango bouna, isolated in the North.

Ghana counts a single language, Akan, belonging to the Kwa branch and spoken in the South. Similarly, Benin counts a single language with CI-reduplication, Fon, a Kwa language, also spoken in the Southern neighbouring country, Togo.

Nigeria and Cameroon constitute a hot-bed for languages with CI-reduplication. Both countries totalize 22 languages, 15 in Nigeria and 7 in Cameroon. Nigeria counts 2 main language clusters and 2 isolated languages.

- The first cluster comprises 6 West Benue-Congo languages, Yoruba, Nupe, Emai, Arigidi, Oko, and Igbo located in Southern Nigeria. Regarding the geographical area, Yoruba and Nupe are located in the Southwest, Arigidi, Emai and Oko in the South center and Igbo is isolated in the Southeast.
- The second cluster counts 2 West Chadic languages, Ron [Daffo, Fyer, Kulere, Bokkos] and Mwaghavul surrounded by 5 Plateau languages, Hyam (Nok and Kwoi), Ninzo, and Ningye in the west, Fyam and Tarok in the East. Plateau and West Chadic languages are spoken in the Plateau State in Nigeria.
- Obolo and Kutep are isolated in the South and Northeast of Nigeria respectively. Kutep is spoken across the border in Western Cameroon.

Cameroon counts 7 Niger-Congo languages.

- A cluster of 6 languages in Western Cameroon comprising 1 Jukunoid language, Beezen; and 5 Bantoid languages: Vengo, Isu and Zhoa (Ring), Bafut (Ngemba), and Fe'fe' (Bamileke).
- Makaa (Narrow Bantu) is isolated in the Eastern Region.

The distribution of CI-reduplication forms and functions is as summarized in Table 2.6.

Table 2.7: Distribution of forms + functions over language filiations

Area + Language Filiation	Language	Form	Function
Côte d'ivoire			
Kru	Krumen	Type IIIa	WF (action/stative noun)
Gur	Kulango	Type IIIc	??
Kwa	Anyin Abidji Attié	Type IIIc	?? Intensification (verb) ??
Ghana			
Kwa	Akan	Type IIIc	Plurality (pluractional) WF (verb)
Benin/Togo			
Kwa	Fon	Type IIIa	Intensification (verb) WF (action/stative nouns, adjective)

Nigeria			
West Benue-Congo	Arigidi	Type Ia	Duration (persistive)
	Emai		Plurality (frequentative)
	Yoruba	Type IIa	WF (action/stative noun)
	Oko	Type IIb	WF (action/stative noun)
	Nupe	Type IIIa	WF (action/stative noun)
	Igbo	Type IIIa	WF (action/stative noun)
Plateau	Hyam (Nok)	Type IIIc	WF (noun, verb)
	Hyam (Kwoi)	Type IIb	Duration (continuity)
			Plurality (distributive PL)
	Ninzo	Type IIIa	Plurality (adjective, noun)
			WF (ADJ, ADV, noun)
	Ningye	Type IIIc	Plurality (ADJ, ADV, noun)
	Tarok	Type IIIb	Intensification (verb)
			Diminution (FEM N/ADV)
			WF (adjective, pronoun)
	Fyam	Type IIIa	Plurality (noun)
West Chadic	Ron	Type IIIc	Plurality (N, ADJ, ADV)
			WF (Noun, verb, ADJ)
			Duration (PROG in Daffo)
	Mwaghavul	not classified	Plurality (pluractional)
Cross River	Obolo	Type IIIa	Pluractional/Intensification
			WF (ADJ, verb, noun)
Jukunoid	Kutep	Type IIIb	WF (noun)
Cameroon			
Jukunoid	Beezen	not classified	Intensification (verb)
Bantoid			
Ring	Vengo	Type Ib	Intensification (verb)
			Duration (progressive)
	Isu	Type IIIc	Intensification (adjective)
			WF (noun)
	Zhoa	not classified	WF (noun, adverb)
Ngemba	Bafut	Type Ib	WF (noun)
Bamileke	Fe'fe'	Type IIIa	Duration/Diminution
			WF (noun)
Narrow Bantu	Makaa	Type IIIb	Diminution (diminutive)
			WF (ADJ, noun, ADV)

From a formal perspective (cf. Table 2.6), CIR type IIIc is the only pattern found in West Chadic, in Ron languages. From a functional perspective, Plurality (increased quantity) and noun formation are the only functions attested in the two West Chadic languages with CI-reduplication, namely Ron and Mwaghavul. Plurality seems to be the more prominent function.

Likewise, CIR Types IIIa and IIIc are the most prominent in Niger-Congo. Intensification (increased quality) and lexical creation are so far the most widespread and predominant functions of CI-reduplication in Niger-Congo. Intensification and diminution are solely attested in Niger-Congo; and the great majority of functions are ranged under increased quantity and lexical formation.

4 specific functions are dominant in certain language families.

- Verb intensification in Kwa (probably in Ring and Jukunoid also, however more data is needed)
- Action and stative noun formation in West Benue-Congo
- Plurality (adjective, adverb, noun, verb) in Plateau
- Lexical creation in Plateau and Bantoid.

10 of the functions marked by CIR are restricted to single languages.

- The simultaneous marking of verb plurality and intensification in Obolo (Cross River)
- The simultaneous marking of continuity and restriction in Fe'fe' (Bantoid, Bamileke)
- The formation of agent nouns in Fe'fe' (Bantoid, Bamileke)
- Distributive plural (noun) in Hyam of Kwoi (Plateau)
- Persistive aspect in Emai (West Benue-Congo)
- Adjective and adverb plurality in Daffo [Ron] (West Chadic)
- Frequentative aspect in Arigidi (West Benue-Congo)
- Diminutives in Makaa (Bantoid, Narrow Bantu)
- Derivation of feminine gender nouns and adverbs in Tarok (Plateau)
- The 3SG reflexive pronoun in Tarok (Plateau).

5 aspectual functions ranged under increased quantity and decreased quality were identified across languages.

- Persistive (increased quantity, duration) in Emai (West Benue-Congo)

- Progressive (increased quantity, duration) in Vengo (Bantoid, Ring) and Daffo [Ron] (West Chadic)
- Continuous/Restrictive (increased quantity/decreased quality, duration/diminution) in Fe'fe' (Bantoid, Bamileke)
- Pluractional (increased quantity, plurality) in Akan (Kwa)
- Frequentative aspect (increased quantity, plurality) in Arigidi (West Benue-Congo)

Persistive and Frequentative aspects are marked by CIR Type Ia (found only in West Benue-Congo languages spoken in Nigeria). Progressive is marked by CIR Types Ib and IIIc, pluractional by CIR Type IIIa and IIIc; and simultaneous marking of continuity and restriction by Type IIIa.

Across languages, 7 functions of CI-reduplication are found at least in two distinct language families or in languages sometimes genetically related but not geographically closed.

- Pluractional (increased quantity, plurality) is found in Akan (Kwa, South of Ghana) and in Mwaghavul (West Chadic, Plateau state, Nigeria).
- Progressive (increased quantity, duration) is attested in Vengo (Bantoid, Ring, West Cameroon) and in Daffo [Ron] (West Chadic, Plateau State, Nigeria).
- Verbal adjectives describing a state or taste are derived via CIR in Tarok (Plateau, Plateau state, Nigeria), in Fon (Kwa, Benin/Togo), and in Makaa (Bantoid, Narrow Bantu, Eastern Cameroun).
- CIR marks general plural in Ron (West Chadic), and in Fyam, Ningye and Ninzo (Plateau). Languages of both groups are spoken in the Plateau State in Nigeria.
- Verb intensification is attested in Vengo, Isu (Bantoid, Ring, Western Cameroon), Fon (Kwa, Benin/Togo), Obolo (West Benue-Congo, Southern Nigeria), and Tarok (Plateau, Plateau State, Nigeria).
- Action and stative nouns are derived from verbs of action and state in Yoruba, Nupe (West Benue-Congo, Southwest of Nigeria), Igbo, Oko (West Benue-Congo, Southcenter of Nigeria), Fon (Kwa, Benin/Togo), Krumen (Kru, Côte d'Ivoire) and Kutep (Jukunoid, Northeast of Nigeria and across the border in Western Cameroon).
- Several lexical words show remnant traces of derivation via CIR in Makaa, Ron, Kutep, Igbo, Bafut, Zhoa, Isu, Hyam (Nok) and Fe'fe'.

04 functions out of the seven aforementioned functions are shared between at least a Niger-Congo language and one of the two West Chadic languages (cf. 4.1.5 for detail related to the similarities observed between Niger-Congo and West Chadic languages).

- Pluractional (Akan vs. Mwaghavul)
- Progressive aspect marking (Vengo vs. Daffo)
- General plural marking (Fyam, Ningye, Ninzo vs. Ron)
- Lexical creation (Ron vs. Makaa, Kutep, Igbo, Bafut, Zhoa, Isu, Hyam of Nok, Fe'fe)

From the foregoing discussion, CI-reduplication appears to be a property of the Niger-Congo language family rather than a feature of the West Chadic branch of the Afroasiatic language family.

2.8. Conclusion

This Chapter spelt out CIR cross-linguistic generalizations based on formal and functional recurrent patterns observed in the synchronic analyses in chapter 3.

From a formal perspective, the canonical formula of the RED is CI-. The VRED is always short irrespective of the V_1STEM length. However, due to some language-internal requirements, the RED can be I- as in Emai and Ondo Yoruba, or CIN- as in Akan. The RED comprises an onset always identical to the C_1STEM (except from biphonemic onsets (C_1C_2) which reduplicate as C_1) followed by a high vowel. Unlike CC clusters which never reduplicate, C*w*, C*ɥ*, C*j* sequences may reduplicate or not depending on whether they are monophonemic or biphonemic, it all depends on single languages phonological systems.

It has been observed in Igbo, Fyam, Obolo, Fe'fe' and Ningye that labial and velar consonants, as opposed to coronals, produces the same effect on the VRED. In Igbo, Fyam, Obolo, and Fe'fe', labials and velars when followed by a non-high vowel require a high back vowel in the RED as opposed to coronals which require a high front vowel. In Fyam and Ningye, coronals are transparent to roundedness spreading while labials and velars are opaque, i.e., they stop roundedness from spreading from the V_1STEM to the VRED.

From a formal perspective, all CI-reduplication formal types identified cross-linguistically express several meanings (Table 2.4); inversely, one and the same meaning is marked by more than one formal type (Table 2.5). The most widespread CI-reduplication functions are plurality (increased quantity), verb intensification (increased quality) and lexical creation. It is

observed from Tables 2.5 and 2.6 that intensification and diminution are solely attested in Niger-Congo languages. Plurality (increased quantity), lexical creation, and CIR Type IIIc are the common CI-reduplication features found both in Niger-Congo and West Chadic languages. The contact area between Niger-Congo and West Chadic languages is restricted to the Plateau State in Nigeria where the West Chadic languages, Ron and Mwaghavul are surrounded by the Plateau languages Hyam, Fyam, Ningye, Ninzo and Tarok.

CHAPITRE 3: CASE STUDIES

3.1. Introduction

The preceding chapter presented generalizations on CI-reduplication features across languages and the basic constraints these generalizations are couched in. It depicted the morphophonological rules that condition and determine the exact form(s) of the reduplicant, how the choice of a default vowel is operated; the forms and functions of CIR cross-linguistically, and their distribution over language families and geographical areas.

The present chapter presents the case studies on which the generalisations in chapter 2 are based on. It describes as accurately as possible the properties of CIR in the two West Chadic languages (3.2) and in every single Niger-Congo language (3.3) that constitutes the corpus intergrating these descriptions into the unified framework adopted within this study. The corpus is presented according to genetic subgroups, and each subgroup begins with an introduction highlighting the geographical location of languages discussed under it and their affinities if any. Each case study begins with a corpus followed by an analysis which outlines CIR formal and functional patterns, and a simplified derivation that illustrates how rules apply in order to generate the appropriate RED. The main objective in each case study is to provide answers to the following questions:

(a) Which form(s) does/do CIR take? Which segments trigger or condition allomorphy?

(b) Which function(s) does/do CIR fulfil?

(c) Are there different formal types which could be assigned to different functions?

3.2. CI-reduplication in West Chadic: Ron languages

Ron constitutes a subgroup within West Chadic comprised of five languages, namely, Fyer, Bokkos, Daffo-Butura, Sha and Kulere (Jungraithmayr 1970: 1). No data was found on CI-reduplication in Sha. Ron languages are spoken in Nigeria, in Plateau State, and some Ron native speakers use Mwaghavul as L2 (Lewis, Simons & Fennig 2018).

Consider the data in (1) from Bokkos, Daffo, Fyer, and Kulere [Ron]

(1) a. Stems with unrounded vowels

Bokkos [Ron] (Jungraithmayr 1970: 105): Noun plurality

RedF	Gloss	Noun	Gloss
hì-hāj	heads	< hāj	head
mī-rī-rí:m	pythons	< mīrīm	python

Kulere [Ron] (Jungraithmayr 1970: 350ff.): Lexical nouns

kī-kén	bush	?? ken	
ʃī-ʃír	stone wall	?? ʃír	

b. Stems with rounded vowels

Daffo [Ron] (Jungraithmayr 1970: 195, 217): Progressive aspect

tù-tòk	running	< tôk	run
kú-kùm	lion	?? kum	

Fyer [Ron] (Jungraithmayr 1970: 25, 83ff.): Lexical nouns

bù-bô:	spear	?? bo:	
dú-dús	leg	?? dus	

c. Stems with a labio-velarized or labio-velar glide onset

Ron (Jungraithmayr 1970: 217/306): Noun plurality (Kulere)/lexical noun (Daffo)

wù-wàr	he-goats	< wàr	he-goat
gū-gwāt	hills	< gōt	hill
kú-kwîʃ	flight	?? kwiʃ	

d. Stems with a palatalized onset

Bokkos [Ron] (Jungraithmayr 1970: 140ff.): Lexical noun and verbal adjective

fī-fjōk	whistle	?? fjok
hī-hjē	viscera	?? hje
ʤī-ʤjūw	be red	?? ʤjūw

ANALYSIS

Seemingly (cf. Seibert 1998), there are five underlying vowels in Ron which can be divided into two sets of vowels on the basis of the display of CIR in (1). A primary and major distinction is marked between unrounded vs. rounded vowels on the one hand, and a secondary distinction between high vs. low vowels, as only high vowels are allowed in the RED.

(2)

[-round]	[+round]	
i	u	[+high]
e a	o	[-high]

The three vowels on the left are recognized as [-round] and the two vowels on the right as [+round]. The two vowels in the first row are [+high], while the three in the second row are [-high]. The features [round] and [high] are unequivocally sufficient as they help in distinguishing between (i) the two major sets of vowels in (1) conditioning the RED allomorphy; (ii) between [i] and [*u*], i.e. the high unrounded vs. rounded vowels, the two main vowels alterning within the RED; and (iii) between [*i, u*] and [*e, o, a*], high vs. low vowels, as none of the low unrounded nor rounded vowels occurs in the RED.

In (1), it is observed that unrounded stem vowels take C*i*- as RED (1a), and rounded stem vowels C*u*- (1b). Also, it appears in (1) that the assimilatory process triggering the variation of the VRED is not just a purely vocalic issue (1a/b), some consonants also instigate the change (1c/d). When the C_1STEM is a biphonemic labio-velarized consonant or the labio-velar glide /*w*/ (4b), the RED is C*u*- (1c). If the C_1STEM is a palatalized conconant, unlike the quality of the V_1STEM, the RED is C*i*- (1d). The aforementioned contexts conditioning the RED allomorphy are formalized as in (3).

(3)

I[+high] →
- i[-round]/ __CV[-round] (1a)
- u[+round]/
  - __ CV[+round] (1b)
  - __ C*w* (1c)
  - __ C[-cons, -syll, +round] (1c)
  - __ C*j* (1d)

(4) Derivation

Underlying Form		CIR rule	Rule in (3)		
/hāj/	'head'	hI-hāj	hì-hāj		(1a)
/tôk/	'run'	tI-tôk	tù-tòk		(1b)
/kwiʃ/	----	kI-kwiʃ	kú-kwîʃ	'flight'	(1c)
/wàr/	'he-goat'	wI-wàr	wù-wàr		(1c)
/hjɐ/	----	hI-hjɐ	hī-hjē	'viscere'	(1d)

From a formal perspective, Ron is ranged under CIR Type $IIIc_{(ii)}$ pattern based on the fact that the RED is primarily conditioned by Yes/No the V_1STEM is rounded; and also by labio-velarized, the labio-velar glide, and palatalized consonants at stems-initial position.

From a functional perspective, CIR is used in Ron to mark plurality (increased quantity); and for word formation. It marks noun plurality in Bokkos (5a), Kulere (5b), Daffo (5c), and Fyer (5d); adverb and adjective plurality in Daffo (6a) and Fyer (6b) respectively (single cases found so far). Daffo [Ron] uses the suffixes *–aj* and *–aʃ* alongside with CI-reduplication to mark plurality (5c) (Seibert 1998: 24f.). A single case was found in Daffo [Ron] where CIR marks progressive aspect (7). CIR is used in Ron to create lexical nouns referring to things, animals and parts of the body (8); action and movement verbs (9); adjectives of color (10), and verbal adjective of color (11).

(5) Noun plurality in Ron

a. Bokkos [Ron] (Jungraithmayr 1970: 105)

RedF	Gloss	Noun	Gloss
fū-fwáf	breasts	< fóf	breast
sī-sáj	feet/legs	< sâj	foot/leg
hì-hāj	heads	< hàj	head
sì-sjāh	hairs	< sjāh	hair
sī-sījâr	tendons	< sîr	tendon
ʃī-ʃāt	eyes	< ʃīt	eye

b. Kulere [Ron] (Jungraithmayr 1990: 306f., 350ff.)

RedF	Gloss	Noun	Gloss
wù-wàr	he-goats	< wàr	he-goat
gū-gwāt	hills	< gōt	hill
bí-bjél	tails	< bjê:l	tail
dī-djèn	houses	< djèn	house

c. Daffo [Ron] Seibert (1998: 24f.)

RedF	Gloss	Noun	Gloss
fī-fāɗê	ribs	< fāɗê	rib
kū-kῦn	lames	< kῦn	a lame

Daffo Parasynthetic plural: RED + Root + –aj

RedF	Gloss	Noun	Gloss
fì-fíj-āj	backs	< fí	back
fù-fúr-āj	legs	< fùr	leg
tū-tw-áj	bellies	< tu	belly
hī-hār-āj	fetuses	< hâr	fetus

Daffo Parasynthetic plural: RED + Root + –aʃ

RedF	Gloss	Noun	Gloss
kì-kàj-aʃ	grandmothers	< káj	grandmother

d. Fyer [Ron] (Jungraithmayr 1970: 36f.)

RedF	Gloss	Noun	Gloss
fū-fwâʃ	arrows	< fwàʃ	arrow
bì-bén	biceps	< bèn	bicep
hì-hjé	stomachs	< hjè	stomach
jī-já:n	stones	< jān	stone
lī-lé:m	rivers, spittles	< lēm	river, spittle

(6) a. Daffo [Ron] (Jungraithmayr 1970: 170): Adverb plurality

RedF	Adverb	Gloss
vī-vā:t	< vā:t	small, a little

b. Fyer [Ron] (Jungraithmayr 1970: 41): Adjective plurality

RedF	Adjective	Gloss
ɓù-ɓwēl	< ɓwēl	red/brown

(7) Daffo [Ron] (Jungraithmayr 1970: 195): Progressive aspect

RedF	Gloss	Adjective	Gloss
tū-tōk	running	< tōk	run

(8) Lexical nouns

a. Fyer [Ron] (Jungraithmayr 1970: 25, 83ff.)

RedF	Gloss	Simplex
bù-bô:	spear	?? bo:
dú-dús	leg	?? dus
ɗú-ɗó	wind	?? ɗo
fū-fwɔ̀	door	?? fwo

b. Bokkos [Ron] (Jungraithmayr 1970: 140ff.)

RedF	Gloss	Simplex
bì-bìn	garden	?? bin
fī-fjōk	whistle	?? fjok
hī-hjē	viscera	?? hje

c. Daffo [Ron] (Jungraithmayr 1970: 217)

RedF	Gloss	Simplex
kù-kōr	stone wall	?? kor
kú-kùm	lion	?? kum
kú-kwîʃ	flight	?? kwiʃ

d. Kulere [Ron] (Jungraithmayr 1970: 350ff.)

RedF	Gloss	Simplex
bū-bûr	cockroach	?? bur
gú-gà	red monkey	?? ga
kī-kén	bush	?? ken
kú-kôh	thorax	?? koh
ʃī-ʃír	earth	?? ʃir

(9) Lexical verbs

a. Fyer [Ron] (Jungraithmayr 1970: 25, 83ff.)

RedF	Gloss	Simplex
bū-bwàt (v)	lose	?? bwat
ʃū-ʃwēt (v)	fear	?? ʃwet

b. Bokkos [Ron] (Jungraithmayr 1970: 143ff.)

RedF	Gloss	Simplex
kī-kā	hurry up	?? ka
kī-kàŋ	stutter	?? kaŋ
tī-tàl	run	?? tal

c. Daffo [Ron] (Jungraithmayr 1970: 217ff.)

RedF	Gloss	Simplex
kù-kwòk	grind	?? kwok
sī-sàl	laugh	?? sal
ʃī-ʃèːr	be afraid	?? ʃeːr

d. Kulere [Ron] (Jungraithmayr 1970: 352ff.)

RedF	Gloss	Simplex
gī-gjāl	laugh	?? gjal
tū-tó	spit	?? to

(10) Bokkos [Ron] (Jungraithmayr 1970: 107): Lexical adjective (of color)

RedF	Gloss	Simplex
sī-sā	brown	?? sa
rū-rùm	white gray	?? rum

(11) Bokkos [Ron] (Jungraithmayr 1970: 143ff.): LexicalVerbal adjective (of color)

ʤī-ʤjūw	be red	?? ʤjuw
pī-pēl	be white	?? pel
kī-kjāw	be black (grass)	?? kjaw

A single example of CI-reduplication marking increased quantity, pluractional was found in Mwaghavul, another West Chadic language.

(12) Mwaghavul (Blench 2011a: 56): Pluractional

RedF	verb	Gloss
ʧì-ʧèt	< ʧèt	cook

3.3. CI-reduplicationin Niger-Congo

The majority of languages with CI-reduplication belong to the Niger-Congo family, and all of them exploit the various formal patterns of CIR listed in § 2.7.1 to mark increased and/or decreased quantity and quality, and for lexical creation. CI-reduplication was found in 27 languages so far widespread as follows: 6 West Benue-Congo languages (Yoruba, Emai, Arigidi, Igbo, Nupe and Oko); 5 Plateau languages (Ningye, Ninzo, Hyam, Fyam and Tarok); 2 Jukunoid languages (Kutep and Beezen); 1 Cross River language (Obolo); 6 Bantoid languages (Vengo, Isu, Zhoa, Fe'fe', Bafut and Makaa), 5 Kwa languages (Anyin, Abidji, Attié, Akan and Fon); 1 Kru language (Krumen); and 1 Gur language (Kulango). These languages are spoken in Nigeria, Cameroon, Côte d'Ivoire, Ghana, Benin and Togo.

3.3.1 West Benue-Congo

3.3.1.1 Yoruba

Consider the data in (13) from Yoruba

(13) Yoruba: Akinlabi (2004: 288f.): Action and stative nouns

a. High unrounded vowel stems

RedF	Gloss	Verb	Gloss
wí-wí	saying	< wí	say
dí-dì	tying	< dì	tie
fí-fɛ́[20]	loving	< ***fɛ́***	love
rí-rá	crawling	< ***rá***	crawl

b. High rounded vowel stems

bí-bú ~ *bú*-bú	cursing	< bú	curse
kí-kū ~ *kú*-kū	butchering	< kū	butcher
tí-tɔ́	taking care of	< ***tɔ́***	take care of
lí-lò	using	< ***lò***	use

c. Nasal high unrounded vowel stems

sí-sɪ̄ ~ *sɪ́-sɪ̄*	burying	< sɪ̄	bury
kí-kɪ́ ~ kɪ́-kɪ́	wiping	< kɪ́	wipe
dí-dɪ́ ~ dɪ́-dɪ́	frying	< dɪ́	fry (in oil)
tí-tã	shining	< ***tã***	shine

[20] Bolded examples are from Ihiunu & Kenstowicz 1994

d. Nasal high rounded vowel stems

kí-kṹ ~ kṹ-kṹ	being full	< kṹ	be full
gí-gù̃ ~ gṹ-gù̃	being long/tall	< gù̃	be tall/long
rí-rù̃ ~ rṹ-rù̃	giving out an odor	< rù̃	give out an odor
pí-pɔ̃	being ripe	< ***pɔ̃***	be ripe

e.

Nasality only	Roundedness only
*kĩ-kũ	*ku-kũ
*gĩ-gũ	*gu-gũ
*rĩ-rũ	*ru-rũ
*hĩ-hũ	*hu-hũ

f. Non-high nasal vowel stems

fí-fɔ̃	*fḯ-ɟɔ̃	blowing	< fɔ̃	blow
tí-tà̃	*tḯ-ɩà̃	deceiving	< tà̃	deceive

ANALYSIS

There are seven underlying vowels in Yoruba [*i, e, ɛ, a, u, o, ɔ*], Akinlabi (2004: 454ff.). Generally, the RED in Yoruba comprises a copy of the C_1STEM followed by the high tone, high front unrounded vowel [í] unlike the quality of the stem vowel (13) (Akinlabi 1985, Pulleyblank 1988, Ola-Orie 1995). However, if the stem comprises the high, back vowel [*u*], the VRED optionally assimilates backness (Akinlabi 2004: 288) as illustrated in (13b/d). Note that the forms with [*i*] are currently used and preferred by Yoruba speakers to those with [*u*]. If the V_1STEM is a nasalized, high vowel, [*ĩ*] or [*ũ*], the RED alternates freely between C*i*- ~ C*ĩ*- (13c) or C*i*- ~ C*ũ*- (13d) respectively (Akinlabi 2004: 288). Put differently, nasality and backcopying always go together as a bundle (13e). Non-high nasal vowel stems fail to transfer nasality onto the RED (13f). The rule conditioning the RED allomorphy in Yoruba is formalized as in (14).

(14) V[+high] → í [-back, <nasal>] ~ ú[+back, <nasal>] / _Cu[+high, +back, <nasal>]

In Ondo Yoruba (Ola-Orie 1997: 40), a Yoruba dialect, the RED is either C*i*- or *i*- depending on Yes/No the stem is consonant-initial. CIR in Ondo Yoruba is formalized as follows.

(15) C_0V[+high] → C_0í [-back] / _C_0V

(16) Ondo Yoruba (Ola-Orie 1997: 71): Action noun

a. Consonant-initial stems

lí-lɔ̄	going	< lɔ̄	go
ʤí-ʤɛ̄	eating	< ʤɛ̄	eat

b. Vowel-initial stems

í-ɛ̀˜	walking	< ɛ̀˜	walk
í-ɛ́ʤɛ̄	cheating	< ɛ́ʤɛ̄	cheat

From a formal perspective, CI-reduplication in Yoruba is of the Type IIa pattern as the quasi-fixed VRED freely assimilates backness if only the V_1STEM is the high unrounded vowel [*u*]. The fact that the VRED vowel is in free variation certainly mirrors a possible transition from a variable or quasi-fixed RED to a completely fixed one, or the other way round, i.e. the completely fixed vowel in the RED undergoing assimilation.

(17) Derivation

Underlying Form		CIR rule	Rule in (14)	
/wí/	'say'	wÍ-wí	wí-wí	(13a)
/kú/	'butcher'	kÍ-kú	kí-kú ~ kú-kú	(13b)
/sĩ̄/	'buy'	sÍ-sĩ̄	sí-*sĩ̄* ~ *sĩ́-sĩ̄*	(13c)
/gù˜/	'be tall'	gÍ-gù˜	gí-gù˜ ~ gű-gù˜ *gú-gù˜ *gĩ́-gù˜	(13d)
/tà˜/	'deceive'	tÍ-tà˜	tí-tà˜ *tĩ́-ɪà˜	(13f)

From a formal perspective, CI-reduplication is used in Yoruba to derive action and stative nouns from verb stems, cf. examples (14). In Emai and Arigidi, two languages related to Yoruba, the RED behaves similarly as in Ondo Yoruba. CIR is used to mark persistive aspect (increased quantity, duration) in Emai (18a), and frequentative aspect (increased quantity, plurality) in Arigidi (18b).

(18) a. Emai (Egbokhare 1990 cited by Ola-Orie 1997: 80): Persistive aspect

Consonant-initial stem

RedF	Gloss	Verb	Gloss
tí-tà	still say	< tà	say
gbí-gbè	still beat	< gbè	beat

Vowel-initial stem

í-è	still eat	< è	eat
í-ɔ̃	still drink	< ɔ̃	drink
í-ù	still die	< ù	die

b. Arigidi (Orie 1997: 55): Frequentative aspect

ʤì-ʤú:	eat anyhow	< ʤú	eat
kpì-kpɛ́:	dig anyhow	< kpɛ́:	dig
kì-kó:	sing anyhow	< kó:	sing
ʤì-ʤɛ́:	dance anyhow	< ʤɛ́:	dance

3.3.1.2. Igbo

Consider the data in (19) paying attention to the quality of the reduplicant vowel in comparism with the stem vowel.

(19) Igbo (Ihiunu & Kenstowicz 1994: 2f.): Action nouns

a. Roots with high vowels

RedF	Gloss	Verb	Gloss
pì-pì	hitting on head with knuckle	< pì	hit with knuckle on the head
zʊ́-zʊ́	buying	< zʊ́	buy
ʧú-ʧú	liquid	< ʧú	fetch liquid
$p^hí$-$p^hí$	whittling	< $p^hí$	whittle

b. Roots with coronal obstruent onsets and non-high vowels

sì-sè	stirring	< sè	stir (water)
sī-sṓ	pricking	< sṓ	prick
ṭí-ṭá	biting	< ṭá	bite
ʤí-ʤɔ́	being uggly	< ʤɔ́	be uggly
ʧí-ʧɔ́	wanting	< ʧɔ́	want
zì-zɔ̀	trampling	< zɔ̀	trample

c. Roots with sonorant onsets and non-high rounded vowels

nì-nɔ̀ ~ nʊ̀-nɔ̀	staying	< nɔ̀	stay
lí-ló ~ lú-ló	swallowing	< ló	swallow
rì-rò ~ rù-rò	settling	< rò	settle
rì-rɔ̀ ~ rʊ̀-rɔ̀	bending	< rɔ̀	bend

d. Roots with labial onsets and non-high vowels

mú-mé	making	< mé	make
mú-má	knowing	< má	know
wù-wè	taking	< wè	take
fú-fó	uprooting	< fó	uproot
fʊ́-fɔ́	remaining	< fɔ́	remain
gbú-gbé	crawling	< gbé	uproot

e. Roots with labio-velarized onsets and non-high vowel

kʷú-kʷé	believing	< kʷé	believe
kʷʊ̀-kʷà	pushing	< kʷà	push
gʷʊ́-gʷá	telling	< gʷá	tell
ŋʷʊ̀-ŋʷà	tempting	< ŋʷà	tempt
kʷʊ́-kʷɔ́	grinding	< kʷɔ́	grind

ANALYSIS

There are eight underlying vowels in Igbo which, traditionally, can be divided into two sets of vowels, as in (20), on the basis of their height, roundedness, and tenseness.

(20)

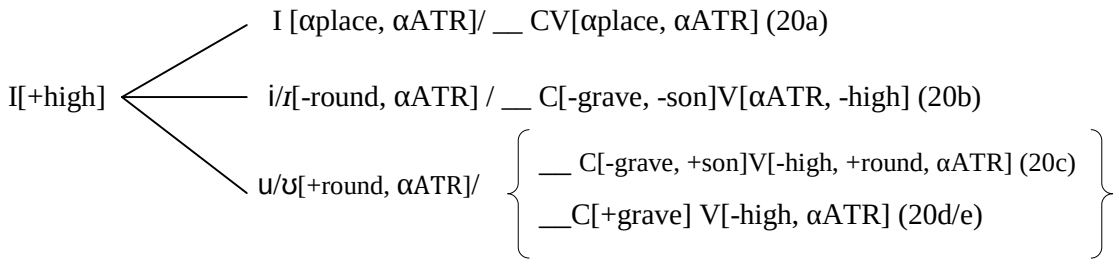
[-round]		[+round]		
[+ATR]	[-ATR]	[+ATR]	[-ATR]	
i	ɪ	u	ʊ	[+high]
e	a	o	ɔ	[-high]

The features [high], [round], and [ATR] are sufficient enough to contrast Igbo vowels as they help to mark the distinction between the two major sets of vowels in (19) conditioning the RED allomorphy, i.e. high vs low vowels; to mark the distinction between rounded vowels which, as opposed to unrounded vowels, turn the RED to C*u*- or C*ʊ*- depending on the quality of the C_1STEM; and finally to harmonize the VRED with the V_1STEM in tenseness. Take note that all Igbo rounded vowels are also back.

It is observed in (19) that both the V_1STEM and the C_1STEM trigger the VRED change, and that CIR in Igbo consists of reduplicating the C_1STEM followed by a high vowel that harmonises in backness and tenseness with the V_1STEM or in graveness with the C_1STEM (cf. Anyanwu 1996: 61, 16; Ihiunu & Kenstowicz 1994: 2). A synopsis of the various contexts in (19) à la

Ihiunu & Kenstowicz (1994: 2ff.) illustrating the incidence of the C_1STEM or the V_1STEM on the VRED is formalized in (21)

(21)



Rule (21) stipulates the following:

In case the V_1STEM is high, the RED and the stem-initial CV are identical (19a). On the other hand, if the V_1STEM is non-high, there is never complete identity between the root and the RED. The VRED in such a context alternates between [*i, ɪ*] and [*u, ʊ*] under the influence of either the V_1STEM or the C_1STEM

If the C_1STEM is a coronal obstruent, i.e an alveolar or a palatal obstruent, the VRED is [*i*] or [*ɪ*] (19b). It has been however observed that in Igbo, if the C_1STEM is a sonorant and the V_1STEM is [+round], the RED tolerates [*u*] or [*ʊ*] as nucleus (19c) (Anyanwu 1996: 162, Ihiunu & Kenstowicz, 1994:8). Finally, if the V_1STEM is [-high] and the C_1STEM is [+grave], i.e. a labial (19d) or a monophonemic labio-velarized dorsal sound (19e), the VRED is [*u*] or [*ʊ*]. Though not mentioned in the rule in (20) as not deemed necessary, note that, unlike in Yoruba (cf. §3.3.1.1) where the RED freely assimilates nasalization only in case the V_1STEM is a nasal, high vowel, in Igbo (see 19b, 23) it is always copied no matter the VRED height. The RED in Igbo bears an identical tone with the stem.

(22) Derivation

Underlying Form		CIR rule	Rule in (21)	
/pʰí/	‘whittle’	pʰI-pʰí	pʰí-pʰí	(19a)
/sṍ/	‘prick’	sI-sṍ	*sĩ́-s*ṍ	(19b)
/rɔ̀/	‘bend’	rI-rɔ̀	rì-rɔ̀ ~ rʊ̀-rɔ̀	(19c)
/mé/	‘make’	mI-mé	mú-mé	(19d)
/ŋʷà/	‘tempt’	ŋʷI-ŋʷà	ŋʷʊ̀-ŋʷà	(19e)

From a formal point of view, taking into consideration the fact that the contrast high vs. non-high vowel is the primary mechanism governing CIR in Igbo, and that the VRED is also conditioned simultaneously by both grave vs. non-grave consonants depending on the V_1STEM quality, one can conclude that Igbo belongs to CIR Type IIIa$_{(ii)}$.

From a functional perspective, CI-reduplication is used in Igbo to generate nouns (23a-b) though not very productive. It is also used productively in deriving action nouns (19-23c).

23. Igbo (Anyanwu 1996: 61f.): Nouns

a. Nouns derived from existing stems

RedF	Gloss	Verb	Gloss
kʰʊ́~kʰɔ́~	story	< kʰɔ́~	tell, narrate
ɣʊ̀-ɣɔ̀	trick	< ɣɔ̀	play
ʤʊ́-ʤʊ́	question(s)	< ʤʊ́	ask

b. Lexical nouns

fʰʊ́~fʰɔ́~	egg plant	?? fʰɔ
kʰʊ́-kʰɔ́	leaf, book, studies	?? kʰɔ
kʰʊ́-kʰɔ̀	chicken	?? kʰɔ

c. Action nouns

RedF	Gloss	Verb	Gloss
kʷú-kʷɛ́	agreeing	< kʷɛ́	agree
zĩ-zà~	sweeping	< zà~	sweep
kpʊ́-kpɔ́	calling	< kpɔ́	call
zù~zò~	raining	< zò	rain
zʊ́~zʊ́~	buying	< zʊ́~	buy
mɪ́-mɪ́	drying	< mɪ̄	dry
bű-bű	carrying	< bu~	carry
tì-tì	cracking	< tì	crack (nuts)

3.3.1.3. Nupe

Consider the data in (24) from Nupe.

(24) Nupe (Kandybowicz 2008: 58, 88): Action and stative nouns

a. Stems with unrounded vowels

RedF	Gloss	Verb	Gloss
jī-jí	shrinking	< jí	shrink
jī-jà	giving	< jà	give
pī-pā	pounding	< pā	pound
jī-jé	responding	< jé	respond
gī-gé	being good	< gé	be good

b. Stems with rounded vowels

dū-dū	cooking	< dū	cook
wū-wú	teaching	< wú	teach
wū-wō	drying	< wō	be dry

ANALYSIS

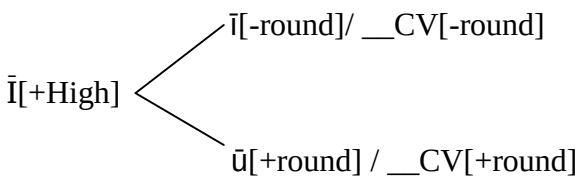
There are five underlying vowels, [*i, e, a, o, u*], identified in Nupe based of the data in (24). These vowels can be divided into two contrastive sets of vowels, i.e. rounded vs. unrounded, with regard to how CIR displays in Nupe.

(25)

[-round]	[+round]
i	u
e	o
a	

It is oberved in (24) that the RED in Nupe consists of a copy of the C_1STEM followed by a mid tone high vowel (Kandybowicz 2008: 88). the RED is C*i*- for stems with unrounded vowels (24a) and C*u*- for stems with rounded vowels (24b).

(26)



(27) Derivation

Underlying Form		CIR rule	Rule in (26)	
/jí/	'shrink'	jĪ-jí	jī-jí	(24a)
/gé/	'be good'	gĪ-gé	gī-gé	
/pā/	'pound'	pĪ-pā	pī-pā	
/wō/	'be dry'	wĪ-wō	wū-wō	(24b)
/dū/	'cook'	dĪ-dū	dū-dū	

From a formal perspective, Nupe is ranged under CIR Type IIIa$_{(i)}$ as the primary mechanism governing the RED allomorphy is the distinction between high vs. non-high stem vowels. Also, labio-velarized onsets influence the VRED. From a functional perspective, Nupe uses CI-reduplication to derive action and stative nouns, cf. (24).

3.3.1.4. Oko-Eni-Osayen

Consider Oko data in (28) paying attention to the quality of the reduplicant vowel.

(28) Oko (Atoyebi 2010: 76ff.)

(i) Action nouns

a. [+ATR] verb stems with default RED

RedF	Gloss	Verb	Gloss
sí-sīē	doing	< sīē	do
rí-rō	thinking	< rō	think
sí-sū	marrying	< sú	marry

b. [+ATR] verb stems with the labio-dental fricative and the high back vowel

fú-fūrū	jumping	< fùrū	jump

(ii) Stative nouns

a. [+ATR] verb stems with default RED

gbí-gbōdī	being fat/big	< gbōdī	be big/fat
fí-fī	being hot	< fí	be hot
gí-gīŋān	being sour	< gíŋán	be sour

b. [+ATR] verb stems with the labio-dental fricative and the high back vowel

fú-fūn	being wet/cold	< fún	be wet/cold

(29) Oko (Atoyebi 2010: 76ff.)

(i) Action nouns

[-ATR] verb stems

gbɛ́-gbā	seeing	< gbá	see
sɛ́-sɛ̄	catching	< sɛ́	catch
ɲɛ́-ɲɛn̄	remembering	< ɲɛ́n	remember
nɛ́-nā	receiving	< ná	receive

(ii) Stative nouns

[-ATR] verb stems

fɔ́-fɔ̄	being tall	< fɔ́	be tall
bɛ́-bɛr̄ɛ̄	being soft	< bɛr̄ɛ̄	be soft

ANALYSIS

There are seven underlying vowels in Oko which, on the basis of how CIR displays in (29), can be distinctively described as in (30).

(30)

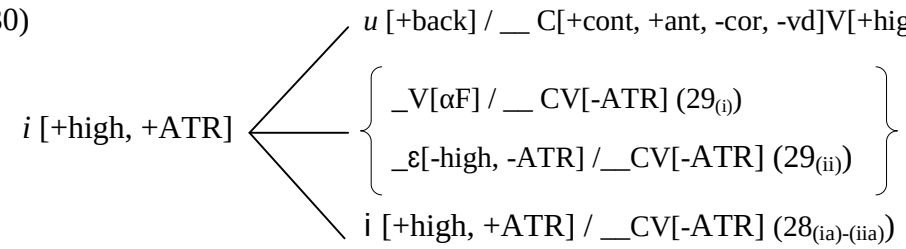
[-back]	[+back]		
i	u	[+high]	[+ATR]
e	o	[-high]	
ɛ	ɔ		[-ATR]
	a		

In general, the RED is *Ci-*, and it varies with respect to the tenseness of the V_1STEM. The RED bears a H(igh) for H(igh) and M(id) stems and a L(ow) for L(ow) stems (Atoyebi 2010: 76f.). From a formal point of view, Oko employs two slightly different mechanisms of CIR depending on the function fulfilled, namely, the derivation of action vs. stative nouns from action and stative verbs respectively (cf. 3.3.1.4).

For action and stative nouns, when the V_1STEM is [+ATR], the default RED is C*i*- ($28_{(ia)\text{-}(iia)}$), and it turns to C*u*- if the V_1STEM is the high back vowel /*u*/ preceded by the labio-dental /*f*/ ($28_{(ib)\text{-}(iib)}$). On the contrary, if the V_1STEM is [-ATR], the RED is C*ɛ*- for action nouns due to vowel harmony and the lack of a [-ATR] high vowel in Oko ($29_{(i)}$); and it is identical to the stem-initial CV ($29_{(ii)}$) for stative nouns, Atoyebi (2010: 76f.). (30) formalizes the

phonological rule describing the variation of the RED in the process of derivation of both action and stative nouns in Oko.

(30)



(31) Derivation

Underlying Form		CIR rule	Rule in (30)	
/sú/	'marry'	sI-sú	sí-sū	(28(ia))
/fúrū/	'jump'	fI-fúrū	fú-fūrū	(28(ib))
/gbōdī/	'be big'	gbI-gbōdī	gbí-gbōdī	(28(iia))
/fún/	'be wet'	fI-fún	fú-fūn	(28(iib))
/gbá/	'see'	gbI-gbá	gbɛ́-gbá	(29(i))
/fɔ́/	'be tall'	fI-fɔ́	fɔ́-fɔ̄	(29(ii))

CI-reduplication in Oko is ranged under CIR Type IIb as the almost fixed C*i*- RED is constrained to assimilate backness only when the stem-initial CV is *fu*.

Oko uses CI-reduplication to derive action and stative nouns (32) (see (28) and (29) also). The process is highly productive in the language and applies to all verbs (Atoyebi 2010: 77). Oko distinguishes two types of nominals: action nouns derived from action verbs (32a), and stative nouns derived from stative verbs (32b).

(32) Oko (Atoyebi 2010: 76f.): Action and stative nouns

a. Action nouns

[+ATR] verb stems

RedF	Gloss	Verb	Gloss
ʤí-ʤīn	opening	< ʤín	open
fú-fūrū	jumping	< fùrū	jump

[-ATR] verb stems

gɛ́-gā	sewing	< gá	sew
ɲɛ́-ɲɛn̄	remembering	< ɲɛ́n	remember

b. Stative nouns

[+ATR] verb stem

ʧí-ʧīlē	being strong	< ʧīlē	be strong
fú-fūn	being wet/cold	< fún	be wet/cold

[-ATR] verb roots

lɔ́-lɔ̄rɛ̄	being long	< lɔ̄rɛ̄	be long
bɔ́-bɔ̄rā	being flat	< bɔ̄rā	be flat

3.3.2. Plateau

So far, CI-reduplication was found in 5 Plateau languages all spoken in Nigeria: Ningye, Ninzo, Hyam, Fyam and Tarok.

3.2.2.1. Ningye

Consider the Ningye data below paying a close attention to the quality of the VRED in comparison with that of the V_1STEM.

(33) Ningye (Blench 2011a: 3ff.): Noun plurality

a. (N)C*a*(C) stems

RedF	Gloss	Verb	Gloss
mpə-mpaŋ	stones	< mpaŋ	stone
sə-sa	names	< sa	name
ki-kap	**arrows**	< ***kap***	**arrow**
ku-kwa	**songs**	< ***kwa***	**song**
bu-bwar	**yams**	< ***bwar***	**yam**
mpu-mpja	**vaginae**	< ***mpja***	**vagina**

b. C(j/w)*u*(C) stems

ku-kum	corpses	< kum	corpse
ɲu-ɲu	mouths	< ɲu	mouth
ʧu-ʧju	veins	< ʧju	vein
gi-gju	thieves	< gju	thief

c. C*i*(C) stems

bi-bim	places	< bim	place
mpi-mpin	bundles	< mpin	bundle
ji-ji	eyes	< ji	eye
ndʒi-ndʒi	knives	< ndʒji	thief

d. C<j>*e*(C) stems

mbe-mbekar	head-pads	< mbekar	head-pad
ke-kje	things	< kje	thing
ʃi-ʃe	**years**	< ***ʃe***	**year**
ki-kjeŋ	**fists**	< ***n-kjeŋ***	**fist**

e. C<w>*ɛ*(C) stems

$m^{w}ɛ$-$m^{w}ɛr$	goitre	< $m^{w}ɛr$	goitre
rɛ-rɛn	pots	< rɛn	pot
di-dɛ	**chins**	< ***dɛ***	**chin**

f. C*o*(C) stems

tu-tos	**poison**	< ***tos***	**poison**
ʒu-nʒom	**horns**	< ***n-ʒom***	**horn**
bo-bo	mountains	< bo	mountain

g. C*ɔ*(C) stems

ku-kɔp	compounds	< kɔp	compound
gu-gɔŋ	backs	< ŋ-gɔŋ	back
ti-tɔŋ	ears	< tɔŋ	ear
ru-rɔŋ	stools	< rɔŋ	stool

ANALYSIS

There are eight phonemic vowels in Ningye which, traditionally, can be divided into two sets of vowels, as in (34), on the basis of their height and roundedness.

(34)

[-round]	[+round]	
i	u	[+high]
e ə ɛ a	o ɔ	[-high]

Ningye figures among languages in which CIR is difficult to apprehend due probably to an ongoing change. The following observations can be made from (33) with regard the quality of the VRED. (i) For stems with the high, unrounded vowel [*i*] (33c), the RED is always identical to the stem-initial CV. For stems comprising the non-high, unrounded vowels [*a*] (33a), [*e*] (30d), and [*ɛ*] (33e), the RED sometimes surfaces as a complete copy of the stem-initial CV (33e), or as C*ə*- (33a) exception made from bolded cases comprising remnant traces of CI-reduplication where the RED is C*i*- in most cases, cf. 33a/d/e; or C*u*- for stems with a labial onset in (33a). For stems comprising the non-high, rounded vowels [*o*] (33f) and [*ɔ*] (30g), the RED agrees in roundedness with the V_1STEM in almost all cases although there are a couple of odd exceptional cases, ti-tɔŋ 'ears' < tɔŋ 'ears' and bo-bo 'mountain' < bo 'mountain'.

The vowel [*ə*] is rare in Ningye, and no reduplicative derived from a base comprising this vowel was found in the primary source, i.e. in Blench 2011a. Though the last two enties derived via CIR in (33b) comprise both palatalized onsets, it is seen however in *ʧu-ʧju* 'veins' that the stem high vowel takes precendence over the palatalized onset and turns the VRED to [*u*]. In *gi-gju* 'thieves' on the contrary, it is rather the palatalized onset that takes precedence over the stem vowel turning the VRED to [*i*]. This deviant behavior of coronal sounds as opposed to velars certainly reinforce the idea according to which they belong to two contrastive natural classes of sounds, [+grave] vs. [-grave] sounds. An alternative analysis regarding *ʧj* and *gj* sequences will be to claim that the palatalized affricate is monophonemic, while the palatalized velar is biphonemic. The second alternative poses a problem still as it makes it difficult to accurately justify the simplification of *ʧj* → *ʧ* in the RED and not in the stem. It resurrects the troublesome debate regarding the over- vs. underapplication of rules within reduplicatives which is far beyond the scope of this study.

From a formal perspective, though the ongoing changes in Ningye do not permit to apprehend the phenomenon of CIR with exactness, from the observations drawn from (33), it seems CIR in Ningye is of the Type $IIIc_{(ii)}$ pattern as both rounded vowels (33c/f/g) and labial onsets (33a) constraint the VRED to assimilates backness and roundedness, left aside some odd cases mentioned previously. From a functional perspective, CIR is used in Ningye to mark noun plurality (increased quantity) (cf. example 33).

3.2.2.2 Ninzo

Consider the Ninzo data in (35) from Hoener 1980 paying attention to the quality of the VRED in comparison with that of the V_1STEM.

(35) Ninzo (Hoerner 1980: 40, 48): Adjectives

RedF	Gloss	Simplex
Lule ~ lile / rure ~ rire	long	?? le/re
ʃi-ʃir	black	?? ʃir
kikla ~ kukla	white	?? kla
sisar ~ susar	red	?? sar
lì-lé	deep	?? lé

ANALYSIS

There are seven phonemic vowels[21] in Ninzo which, traditionally, can be divided into two sets of vowels, as in (34), on the basis of their height and roundedness.

(36)

[-round]		[+round]	
i	ɨ	u	[+high]
e	ə	o	[-high]
	a		

It is observed in (35) that the RED in Ninzo seems to be C*i*-; and for some stems it freely alternates between C*i*- and C*u*-. Synchronically, it is a difficult task to retrieve the exact circumstances under which [*i*] turns to [*u*]. In her account of reduplication in Ninzo, Hoener 1980, notes the following:

> *Eines der schwierigsten Probleme in diesem Corpus ist das anscheinend willkürlich wechselhafte Auftreten von /i/ und /u/ in bestimmten morphologischen und morphophonologischen Umgebungen. Eine bis jetzt nicht zu systematisierende alternative Verwendung der beiden Phoneme geschieht hauptsächlich innerhalb der Reduplikation bei Nomen und bei zwei Verben: si/su, to be, und ni/nu to give. In allen Fällen wird /i/ bevorzugt, aber /u/ ersetzt es ab und zu. Der Grund dafür ist nicht ersichtlich. Die sonst üblichen Ursachen treffen hier nicht zu, denn wenn man nach Vokalharmonie, Vokalassimilation u.ä. sucht, findet man zwar jeweils eine Anzahl passender Beispiel, aber auch viele Gegenbeispiele.* P[38f.]

[21] None of the primary sources, Hoener 1980 nor Blench 2011b, provides any example of a stem with the central unrounded vowel [ɨ].

In other words, she notes that the most difficult issue to deal with in her data is the seemingly arbitrary alternation of the VRED from [*i*] to [*u*] in certains morphophonological environments. The fact that both vowels are in free variation within noun, and verb stems such as *si*/*su* 'to be', *ni*/*nu* 'to give' renders the process difficult to systematize. She further notes that vowel assimilation fails to capture neatly the process turning [*i*] to [*u*] due to the many counter-examples found in Ninzo; that C*i*- is generally preferred to C*u*-, and [*i*] changes to [*u*] to satisfy vowel harmony.

Do consider the Ninzo data[22] in (37) from Blench 2011b paying attention to the quality of both the VRED and the V_1STEM in comparison with Hoener's data in (35).

(37) Ninzo (Blench 2011b: 6ff.): Lexical formation and plurality

a. Stems with a high vowel

RedF	Gloss	Simplex	Gloss
ʧī-ʧī (ADJ)	dirty	?? ʧi	
ʧú-ʧū (ADV)	between	?? ʧu	
ī-mgbū-mgbūr (SG)	party guest	?? mgbur	
ī-mī-mì (SG)	ground, earth	?? mi	
ī-wʲī-wʲírr (PL)	arrows	< ā-wʲírr	arrow

b. Stems with a non-high vowel

ā-ʧī-ʧā (SG)	gourd-rattle	?? ʧa	
ī-kī-kə́ (PL)	rice	< ī-kə́	rice
í-jí-jó (PL)	termites	< í-jó	termite
ā-ŋkpī-kpjè (PL)	seniors in status	< àŋkpjè	senior in status
ī-kī-klā (PL)	hoes	< ā-klā	hoe
à-gbí-gblédʒá (PL)	ankles	< í-gblédʒá	ankle

c. Stem with a bilabial or labio-velar onset followed by a non-high vowel

à-mú-mār (PL)	children	< mar	child
ŋgbú-ŋgbá (PL)	ensete [sic]	< ?? ŋgba	

Despite the unpredictability of the RED exact form as noted by Hoerner, diachronically, when one compares and contrasts the data on CI-reduplication in Hoener 1980 and Blench 2011b

[22] Some reduplicatives in (37) are subjected to several phonological processes affecting C_1STEMs. A general observation made in (37a) is that clusters of consonant at C_1STEM-position reduplicate as follows: (a) NC are copied (37a, b). CC clusters undergo a simplification and reduplicate as C (cf. 37a). Cj clusters may or may not reduplicate depending on whether they are underlying single (37a) or sequences (37b) of segments.

with CI-reduplication as displayed in other related and neighboring languages (Ningye, Fyam, Hyam, Igbo and Tarok), one has some clues on how CI-reduplication could have been in Ninzo.

It seems the VRED was primarily conditioned by the V_1STEM height; and secondly by a certain class of consonants. The RED was probably identical to the stem-initial CV for high vowel stems (37a), and C*i*- for non-high vowel stems (37b). In case the C_1STEM was a bilabial nasal (as in Igbo cf. 3.3.1.2) or a labio-velar consonant (37c) followed by a non-high vowel, the RED turned to C*u*- as in CIR Type $IIIa_{(ii)}$ languages, although there are counter-examples in (37b). The prediction made based on Blench's 2011b data seems to be sustained by Hoerner 1980 who notes that:

> *Das Problem der Vokalqualität in redupliezierten Silben wird bei Skip Robinson (1976) behandelt. Dort beeinflussen artikulatorische Eigenschaften von K1 und Vokal des Nominalstammes die Realisierung des Vokals in der reduplizierten Silbe. Probleme in der Analyse ergeben sich in den Fällen, wo K1 und Stammvokal unterschiedliche artikulatorische Eingenschaften aufweisen, z.b /kp/ vor /i/ oder /ʃ/ vor /u/, wo /p/ und /u/ normalerweise ein /u/ in der reduplizierten Silbe bewirken und /i/ und /sh/ ein /i/. In den genanten Fällen ergeben sich oft Variaten, auch innerhalb eines Ideolekts.* P [40]

She points out that the problem posed by the alternation of the RED in Ninzo was first handled by Robinson 1976. Robinson mentioned that the VRED in certain contexts harmonizes with the C_1STEM by assimilating [αplace] features. E.g., labiovelars yield an [*u*] in the RED instead of the habitual [*i*]; palatals yield an [*i*]. However, she observed that Robinson's analysis faces serious problems, Ninzo has several counter-cases, where the VRED fails to copy the onset articulatory features; cf. (38).

(38) Ninzo (Hoerner 1980: 94ff.): Noun plurality

RedF	Gloss	Noun	Gloss
í-gbí-gbù	mountains	< ī-gbú	mountain
à-gbí-gblédʒá	ankles	< í-gblédʒá	ankle
ā-kpī-kpárdʒā	heels	< ì-kpī-kpárdʒā	heel
í-mŋgbí-mgŋbēkū	navels	< ì-mŋgbèkú	navel

In addition to the counter-examples listed in (38), Ninzo counts several reduplicated forms whose singular and plural forms are differentiated by a noun class prefix that seems to condition the VRED (39a). These particular cases certainly suggest that, at a point of the

history of the Ninzo language, the noun class prefixes *i*– and *u*– had an incidence on the VRED after reduplication had applied. Prefix *a*- was mixed and could harmonize with any vowel. This remains a speculation because today none of the rules postulated within this section applies without exception. Ninzo also has cases of exact CV copying (39b).

(39) Ninzo

a. CI-reduplication (Hoerner 1980: 39): Noun plurality

RedF	Gloss	Noun	Gloss
à-gbù-gbà	calabashes	ì-gbí-gbá	calabash
ù-gú-gā	grass	ā-gí-gá	grass
ú-tú-tá	bows	í-tí-tá	bow
ù-ŋgú-ŋgà	branches	ī-ŋgí-ŋgā	branch

b. CV reduplication (Blench 2011b: 6ff.): Lexical creation (noun, adjective, adverb)

kā-kāmī	plenty	?? kami
kpà-kpà	rice	?? kpa
hə̄-hə̄	new	?? hə
gbā-gbā	far	?? gba
ńgbá-ngbá mú	since	?? ngba

The neutralization between [*i*] and [*u*] observed in (38)-(39a) and cases of CV-reduplication probably show that there is an ongoing mutation in Ninzo.

CI-reduplication is used for lexical creation in Ninzo: single gender nouns (40a), adverbs (40b), and adjectives (40c). CI-reduplication is also used in inflection to mark noun (cf. 38, and 39a), and adjective (40d) plurality.

(40) Ninzo

a. Single noun class (Blench 2011b: 6ff.)

RedF	Gloss	Simplex
ì-ŋgbū-ŋgbúɽ	world	?? ŋgbuɽ
ā-ʧī-ʧì	forehead	?? ʧi
ī-gbī-gbjâr	throat	?? gbjar
ī-nfī-nfū	hair	?? nfu
ī-nī-nā	meat	?? na
ú-ŋgbú-ŋgbá	ensete	?? ŋgba

b. Adverb (Blench 2011b: 23)

dzū-dzó ~ dzī-dzó[23]	again	?? dzo
tsú-tsū	between	?? tsu
dzī-dzāŋgō	just now, now	?? dzaŋgo
ʃī-ʃēmī	many	?? ʃemi
$h^wī$-$h^wīr$/fī-fīr	near	?? h^wir/fir

c. Adjective (Hoerner 1980: 40, 48)

lule ~ rure/lile ~ rire	long
ʃi-ʃir	black
kikla ~ kukla	white
sisar ~ susar	red
lì-lé	deep

d. Adjective pluralisation (Hoerner 1980: 49)

tsí-tsà	tsaˈ	little
ŋkpí-ŋkpí	ŋkpì	large/big

3.3.2.3. Hyam (Nok and Kwoi)

- Hyam of Nok: Consider the following data.

(41) Hyam of Nok (Blench 2010b: 5ff.): Lexicalization

a. Noun

(i) Stems with unrounded vowels

RedF	Gloss	Noun
ʃí-ʃɛ̄ŋ	wind	?? ʃɛŋ
dì-dɛ̄k	swamp/wetland	?? dɛk
kī-kērā	ancestor	?? kera
ʃī-ʃēŋ	filter	?? ʃeŋ
sì-sìb	sweat	?? sib
ʤī-ʤìd	head-pad	?? ʤid
kī-kàŋ	tick	?? kaŋ
ʃī-ʃānt	ant (generic)	?? ʃant

[23] Additional data is needed in order to have a complete picture of the behaviour of stems with non-high rounded vowels in Ninzo. If C*i*– and C*u*– REDs equally alternate freely, therefore, Ninzo could be ranged under the CIR Type $IIIc_{(ii)}$ pattern despite the ongoing mutation.

(ii) Stems with rounded vowels

RedF	Gloss	Noun
ku-kó	mother-in-law	?? ko
mbu-mbõĩ	masquerade	?? mbõĩ
ku-koor	snare	?? koor
gu-guk	mail	?? guk
ʤu-ʤubin	beetle	?? ʤubin
kpu-kpɔnt	basket	?? kpɔnt

b. Action verb

(i) Stems with unrounded vowels

dì-dèŋ	stand	?? deŋ
dzī-dzī	walk	?? dzi
ʃī-ʃēt	sit down	?? ʃet

(ii) Stems with rounded vowels

kú-kūm	bend down	?? kum

ANALYSIS

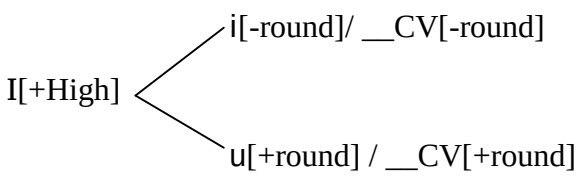
There are seven underlying vowels in Hyam of Nok (Blench 2006a: 2ff.) which can be divided into two contrastive sets of vowels, i.e. rounded vs. unrounded (42), with regard to how CIR displays in (41).

(42)

[-round]	[+round]	
i	u	[+high]
e ə ɛ a	o	[-high]

It is oberved in (41) that the RED in Hyam of Nok consists of a copy of the stem-initial consonant followed by a high vowel. the RED is C*i*- for stems with unrounded vowels ($41a_{(i)}/b_{(i)}$) and C*u*- for stems with rounded vowels ($41a_{(ii)}/b_{(ii)}$). Consequently, Hyam of Nok is a CIR Type $IIIc_{(i)}$. The rule that determines the quality of the VRED in Hyam of Nok is written as in (43).

(43)



(44) Derivation

Underlying Form	CIR rule	Rule in (43)		
/sib/	sI-sib	sì-sìb	'sweat'	($41_{(ai)}$)
/dɛk/	dI-dɛk	dì-dɛ̀k	'swamp'	
/koor/	kI-koor	ku-koor	'snare'	($41_{(aii)}$)
/guk/	gI-guk	gu-guk	'mail'	
/deŋ/	dI-deŋ	dì-deŋ	'stand'	($41_{(bi)}$)
/kum/	kI-kum	kú-kúm	'bend down'	($41_{(bii)}$)

From a functional[24] perspective, CI-reduplication is unproductive in Hyam of Nok as some lexical items only, action verbs and nouns (general) (cf. 41), show remant traces.

- **Hyam of Kwoi**

Consider the data in (45) paying attention to the quality of the RED in comparison with the stem-initial CV.

(45) Hyam (Gerhardt 1988: 53ff.): Continuous aspect/Distributive plural

	RedF	Gloss	Verb	Gloss
a.	kp*í*-kpé	do continuously	< kpé	do
	ɣí-ɣí	eat continuously	< *ɣí*	eat
	d*í*-dúrə́	search continuously	< dúrə́	search
	ʧ*ī*-ɲʧāː	houses of different people	< ʧāː	house
	ɲ*ì*-ɲí	mouths of different people	< ɲí	mouth
b.	ʧí-ʧép	speeches from different people	< ʧép	speech
c.	ʃú-ʃú	faces of different people	< ʃú	face
	ʧʷù-ʧʷēky	noses of different people	< ʧʷ*ēkȳ*	nose

[24] CI-reduplication is to be added to the six processes used in Hyam of Nok to mark noun plurality or lexical creation, namely tone-raising, prefix addition, palatalization, depalatalization, labio-velarization and consonant mutation cited by Blench (2010b: 3).

ANALYSIS

Hyam of kwoi counts among languages difficult to categorized under one of the CIR formal patterns because no rule clearly captures under which circumstance(s) the VRED alternates. The RED seems to be almost fixed, i.e. C*ɪ*- for stems with both high and non high vowels (45a) except from the word in (45b) where the RED is rather C*i*-. It is observed in (45c) that the RED changes to C*u*- either when the stem comprises the high back, rounded vowel [*u*] (as in Oko, CIR Type IIb; or Yoruba, CIR Type IIa), or when its onset is labio-velarized (as in Type III languages). The form dɪ́-dúrə́ 'search intensively/continuously' in (45a) constitutes a counter-example to the roundedness assimilatory rule as the VRED remains [*ɪ*]. Synchronically, it is difficult to state exactly if Yes/No the form ʃú-ʃú is a real case of CI-reduplication or rather an example of complete copying as compared with dɪ́-dúrə́ 'search intensively/continuously'. Also, the occurrence of [*i*] in the RED rather than [*ɪ*] in ʧí-ʧɛ́p is unexpected and certainly reveals an ongoing mutation. From a formal perpective thus, based on the fact that C*ɪ*- seems to be the default RED as it occurs with stems comprising both high vs. non-high, or unrounded vs. rounded vowels on the hand, and that it assimilates backness only in the presence of [*u*], or a labio-velarized onset in the stem, one takes the risk to classify Hyam of Kwoi under CIR Type IIb. However, if it is revealed, based on additional data, that the presence of any round vowel within a given stem turns the RED to C*u*-, then Hyam of Kwoi will be rather characterized as a CIR Type IIIc($_{ii}$) language.

CI-reduplication is used in Hyam of Kwoi inflectionally to mark continuity (45a) and distributive plural (increased of quantity) (45b).

(46) Hyam (Gerhardt 1988: 53ff.): Continuous aspect/Distributive plural

	RedF	Gloss	Verb	Gloss
a.	kpɪ́-kpé	do continuously	< kpé	do
	ɣɪ́-ɣɪ́	eat continuously	< ɣɪ́	eat
	dɪ́-dúrə́	search continuously	< dúrə́	search

	RedF	Gloss	Noun	Gloss
b.	ʧī-ɲʧā:	houses of different people	< ʧā:	house
	ɲì-ɲí	mouths of different people	< ɲí	mouth
	ʧí-ʧép	speeches from different people	< ʧép	speech
	ʃú-ʃú	faces of different people	< ʃú	face

3.3.2.4. Fyam

Consider the following Fyam[25] data from Blench 2010a comparing the quality of the VRED with that of the V_1STEM.

(47) Fyam (Blench 2010a: 7): Noun plural

a. Stem with a high vowel

RedF	Gloss	Noun	Gloss
bà-ʧì-ʧi[26]	heads	< ʧi	head
rí-rìjà	hearts	< rìjà	heart
ɗú-ɗùr	bulls	< ɗùr	bull

b. Stem with labio-velarized/labio-velar glide onset

kú-kwì	rats	< kwì	rat
kú-kwèːr	streams	< kwèːr	stream
mbú-mbwì	mushrooms	< mbwì	mushroom
wú-wòt	castrated goats	< wòt	castrated goat

c. Stem with an alveolar onset followed by a non-high rounded vowel

ɗú-ɗò	rooms	< ɗò	room

d. Stem with a [-grave] onset followed by a non-high vowel

lí-làù	swamps	< làù	swamp
rí-ràm	farms	< ràm	farm
ʧí-ʧàp	wings	< ʧàp	wing
ní-njɛ̀n	foreheads	< njɛ̀n	forehead
ɗí-ɗjèp	grasscutters	< ɗjèp	grasscutter
jí-jàn	elephants	< jàn	elephant
jí-jòŋ	hunger	< jòŋ	hunger

e. Stem with a velar onset followed by a non-high vowel

ɣí-ɣàs	dogs	< ɣàs	dog
kí-kà	thorns	< kà	thorn

[25] Two works attempting an outline description of Fyam were found so far, Nettle 1998 and Blench 2010a. Both analyses concord on the phonemic status of 5 vowels out of the probable 6 that counts Fyam, /*i, e, a, u, o*/. However, they are not unanimous on the existence of /*ə*/ but acknowledge both to perceive the sound [*ɨ*]. Blench (2010a: 5) further notes that [*ə*] is often heard as [*ɨ*]. Thus, based on the phonetic similarity between [*ɨ*] and [*ə*], and on the fact that, in languages having both vowels, [*ɨ*] is always chosen as the default vowel when CI-reduplication applies (cf. Fe'fe', Makaa), I take the risk within this analysis to consider [*ɨ*] rather than [*ə*] as the sixth vowel phoneme.

[26] The RED bears a L rather than a H as predicted by Nettle (1998: 19f.). The exception noted here certainly has to do with the addition of the L noun class prefix to the reduplicative.

ANALYSIS

There are six underlying vowels in Fyam (cf. Nettle 1998, Blench 2010a) which can be divided into two contrastive sets of vowels as in (48), with regard to how CIR displays in (47).

(48)

[-round]	[+round]	
i ɨ	u	[+high]
e a	o	[-high]

It results from the data in (47) that the RED in Fyam is primarily conditioned by the quality of the stem vowel, i.e. by Yes/No it is a high or a non-high vowel; and in secondly by the nature of the C_1STEM, by Yes/No it is [αgrave], i.e labial or velar as opposed to coronals. Regarding the major factor governing CIR in Fyam, it appears that it belongs to the Type $IIIa_{(ii)}$ pattern. The RED bears an unvariable H(ight) (Nettle 1998: 19f.), and counts three allomorphs, *Ci- ~ Cɨ- ~ Cu-*. The rule in (49) formalizes the different contexts in (47) that determine the RED exact allomorph. (47b) (47c)

(49)

Í[+high] →
- Í[αplace] / __ CV[αplace, +high] (47a)
- ú[+back, +round]/ { __ CwV (47b); __ C[-syll, +round] (V[-high]) (47b); __C[-grave, +ant, +cor]V[-high, +round] (47c) }
- í[-back]/ __C[-grave]V[-high] (47d)
- ɨ[+back, -round] / __ C[+grave]V[-high] (47e)

(49) states the following: (i) If the stem comprises a high vowel and the C_1STEM is neither palatalized or labio-velarized, the RED is identical to the stem-initial CV (47a). (ii) If the stem comprises a labio-velarized onset, unlike the degree of graveness of the primary articulator or the quality of the V_1STEM, the VRED is [*u*], likewise if the onset is the labio-velar glide [*w*] (47b). (iii) if the stem comprises a non-high rounded vowel preceded by an alveolar, the VRED is equally [*u*] (47c). (iv) If the C_1STEM is [-grave], i.e. a coronal or palatalized coronal and the V_1STEM is non-high, the VRED is [*i*] (47d). Finally, (iv) if the stem comprises a non-high vowel preceded by a [+grave] consonant, i.e. a labial or a velar, the VRED is [*ɨ*] (47e).

The Fyam data provide additional evidence for an alternative biphonemic interpretation of palatalization and labio-velarization as consonant clusters, i.e C*j* and C*w*, as sequences of vowels in the underlying representation, i.e. C*iu* and C*ui*, rather than monophonemic interpretation, i.e. C^{j} and C^{w}, as it is the case in Igbo and Akan just to name the least.

(50) Derivation

Underlying Form		CIR rule	Rule in (49)	
/ɗùr/	'bull'	ɗÍ-ɗùr	ɗú-ɗùr	(47a)
/kui/	'rat'	kÍ-kui	kú-kwì	(47b)
/wòt/	'castrated goat'	wÍ-wòt	wú-wòt	(47c)
/ɗò/	'room'	ɗÍ-ɗò	ɗú-ɗò	
/ɗièp/	'grasscutter'	ɗÍ-ɗjèp	ɗí-djèp	(47d)
/ɣàs/	'dog'	ɣÍ-ɣàs	ɣí-ɣàs	(47d)

Fyam uses CI-reduplication to mark noun plurality (increased of quantity) (51), see also (47).

(51) Fyam (Blench 2010a: 7): Noun plural

RedF	Gloss	Noun	Gloss
nú-nùŋ	mouths	< nùŋ	mouth
wú-wùl	wind	< wùl	wind
ʧí-ʧɛ̀n	chests	< ʧɛ̀n	chest
fú-fún	rain	< fùn	rain
mú-mùs	cats	< mùs	cat
jí-jèt	buffallo	< jèt	buffallo
lí-ljàŋ	black kites	< ljàŋ	black kite
kú-kwè	leopard	< kwè	leopard

3.3.2.5. Tarok

Consider the Tarok data in (52) comparing the VRED with the V_1STEM each time.

(52) Tarok (Blench & Longtau 2012: 2): Verb intensification

a. Stems with a front vowel or a biphonemic palatalized onset

RedF	Verb	Gloss
kí-kér	< kér	prick
lī-lē	< lē	return
mī-mjār	< mjār	twist

b. Stems with central vowels

lɨ̄-ɨà	< là	speak
dɨ̄-dəŋ̄	< dɨ̄ŋ	sprout

c. Stems with a back vowel or biphonemic labio-velarized onset

jū-jū	< jū	turn mouldy
mú-mó	< mó	deflate
kú-kwí	< kwí	discuss secrets
lū-lwāy	< lwāj	wilt

ANALYSIS

There are seven underlying vowels in Tarok (cf. Langtau 2008:23) which traditionally can be divided in three contrastive sets of vowels, i.e. front vs. central vs. back, on the basis of their place of articulation. Taking into consideration the features and underspecification frameworks as developed within this work, front vowels are described as [-back], and central and back vowels as [+back]. The motivation for using a two-way distinction [±back] rather than a three-way distinction, i.e. front vs. central vs. back lies on the fact that Tarok does not contrast rounded and unrounded central vs. back vowels. Therefore, there is no need to use the feature [front] couple with the feature [back] to define front vowels as [+front, -back], central vowels as [-front, -back], and back vowels as [-front, +back]. Tarok vowels can be distinctively described as in (53). Note that the features [-round] and [+low] are redundant for the vowels [i, e] and [a] respectively, as Tarok counts no rounded front vowels; and a [+low] vowel is unequivocally non-high.

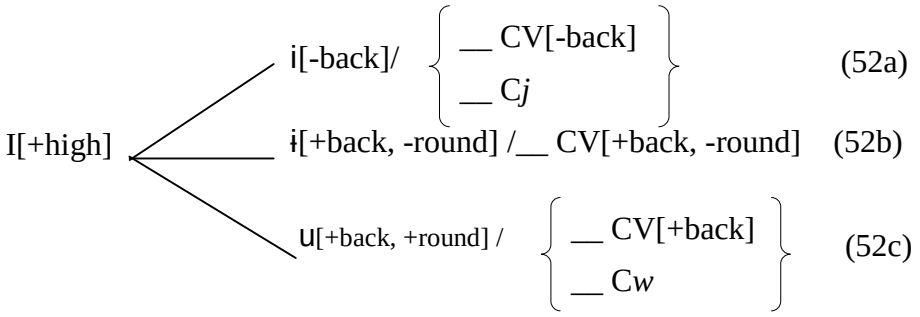
(53)

[-back]	[+back]		
[-round]	[-round]	[+round]	
i	ɨ	u	[+high]
e	ə	o	[-high]
	a		[+low]

The quality of the VRED is determined by the V_1STEM. It is observed in (53) that the RED is C*i*- for stems with a front vowel (53a), C*ɨ*- for stems with a central vowel (53b), and C*u*- for those with a back vowel (33c). If the C_1STEM is a biphonemic palatalized (53a) or labio-velarized segment (53c), the VRED is [*i*] or [*u*] respectively regardless of the V_1STEM quality,

as they are underlying C*u*- and C*i*- respectively. The different realisations of the RED per context are formalized as in (54).

(54)



Based on the fact that the RED in Tarok is solely determined by the VRED place of articulation, it results that Tarok belongs to the CIR Type IIIb pattern.

(55) Derivation

Underlying Form		CIR rule	Rule in (54)	
/lē/	'return'	lI-lē	lī-lē	(52a)
/miār/	'twist'	mI-mīār	mī-mjār	
/là/	'speak'	lI-là	lí-là	(52b)
/mó/	'deflate'	mI-mó	mú-mo	(52c)
/kuí/	'discuss secrets'	kI-kúí	kú-kwí	

Based on tonal melody, Tarok counts three distinct RED patterns associated to CIR functions as summarized in (56) and exemplified in (57).

(56)

CIR Type IIIb	Function
TRED = TSTEM	(i) 3SG reflexive pronoun (ii) verb intensification (iii) adverb from female's language
TRED always L	Noun from female's language
TRED varies upon context	Adjective (describing taste)

CI-reduplication is used in Tarok to mark 3SG reflexive pronoun (57) (Longtau 2008: 130); for verb intensification (58); to derive quality adjectives (59) and nouns specific to female's language (60). The 3SG RFM is obtained by reduplicating the root of the noun ī-ʃí 'head'.

(57) Tarok (Longtau 2008: 130): 3SG reflexive pronoun

RedF	Noun	Gloss
ī-ʃí-ʃí	< ī-ʃí	head

Blench & Longtau 2012, Longtau (2008: 158f.) describes reduplicated verbs as part of the reply to a question requiring an affirmative answer, e.g.: Ūzə̄ līīʧu və̄ lī ɗō? ‘Did he indeed bury the black plum?’; à, ùzə̀ līlī ‘indeed, he burried (it)’. The nominal object is omitted in the response, its absence is compensated by stem reduplication. Verb intensification is illustrated in (58) (see also 52).

(58) Tarok (Blench & Longtau 2012: 2): Verb emphasis (Focus)

RedF	Verb	Gloss
lī-lī	< lī	bury
mī-mə̄n	< mə̄n	agree
pí-pí:	< pí:	insist on
pí-pím	< pím	gnaw
pū-pwā	< pwā	reveal

Tarok has a range of adjectives[27] describing odours derived via CI-reduplication. These terms are bound to occur in a syntactic construction as complements to the verb níŋ ‘to smell’ (Blench & Longtau 2012: 4). Reduplicatives in (59d-g) have two alternatives, partial and total reduplicated forms. The fully reduplicated forms are currently used (Blench & Longtau 2012).

(59) a. Tarok (Blench & Longtau 2012: 4): Adjective describing odours
ā níŋ ʃí-ʃì
3SG smell RED-burn
‘it smells burnt’

b. ā níŋ ɓí-ɓə́ŋ
3SG smell RED-be.bad
‘it smells bad’

c. ā níŋ mú-mwán
3SG smell RED-be.off
‘it smells 'off' (but not so bad that it can’t be eaten)’

[27]Blench & Longtau (2012: 4) refer to these adjectives as ‘ophresological adjectives’

d. ā níŋ vū-vón ~ vōnvōn
3SG smell RED-be.rotten/wet
'it smells rotten egg or wet flour paste'

e. ā níŋ ʧɨ̄-ʧàŋ ~ ʧàŋʧàŋ
3SGsmeɬl RED-be sweet
'it smells sweet (any good smell)'

f. ā níŋ vī-vjàp ~ vjápvjàp
3SGsmell RED-be.spoilt
'it smells spoilt'

g. ā níŋ sɨ̄-sám ~ sámsám
3SGsmeɬl RED-be.sour
'it smells sour (fermented)'

Speech is considered a social marker in Tarok society, not delineating class, but rather social and gender subgroups (Longtau & Blench (2012: 4). In other words men, women, children and young people have a distinctive way of peaking that permits to differentiate each group. As a matter of fact, interrogatives, verbal auxiliaries, locative pronouns and particles, reduplication of noun stems, lexical variation and differentiation through suppletion are major linguistics items[28] that differentiate women's vs. men's discourse, Longtau & Blench (2012: 8ff.). The stems listed in (60a) undergo CI-reduplication to generate nouns specific to the female's language in Tarok. A single case of adverb specific to the female' lect was identified so far (60b).

(60) Tarok (Longtau & Blench 2012: 10)

a. Nouns specific to the female's language

RedF	Noun from male's lect	Gloss
ì-zù-zwà	< ì-zwà	snake
ì-zù-zù	< ì-zù	thorn
ì-zù-zùl	< ì-zùl	chaff
ā-kù-kwà	< ā-kwà	straw
ì-gù-gór	< ì-gór	bag
ì-jì-jáŋ	< ì-jáŋ	bow

b. Adverb specific to the female's language

kə̀ɗí	< kə̀ɗí-ɗí	again

[28]See Longtau & Blench 2012 for more detail on linguistic items distinguishing men's vs. women's speech.

It is observed from the examples in (52), (55)-(60), as predicted in (56), that tones borne by reduplicatives behave differently. In (52), (58) and (60b) tones are transferred from stems to REDs. In (59), the TRED is determined by the context. The RED sometimes bears a tone similar to that of the stem and sometimes not. In (60a), the RED tone is unvariably L.

3.3.3. Jukun: Kutep

Consider the data below.

(61) Kutep (Koops 2009: 21): Nouns expressing action, quality and state

a. Stems with front vowels or biphonemic palatalized onsets

RedF	Gloss	Verb	Gloss
fī-fēr	closing by	< fēr	close by
pì-pìnn	flying	< pìnn	fly
ʧí-ʧǽb	being sick	< ʧǽb	be sick
bī-bjāg	being hot	< bjāg	be hot

b. Stems with the low central unrounded vowel *a*

kī-kāb	thinking	< kāb	think
sì-sà	taking	< sà	take
ʧī-ʧāŋg	walking	< ʧāŋg	walk
fì-ʃàb	being sour	< fàb	be sour
tì-ɪàm	hiding	< tàm	hide

c. Stems with back vowels or a biphonemic labio-velarized onsets

kū-kōb	sewing	< kōb	sew
tū-tō	cooking	< tō	cook
kú-kwáb	trying	< kwáb	try
ʧwú-ʧwé	agreeing	< *í*-ʧwé	agree

ANALYSIS

There are seven underlying vowels in Kutep (cf. Koops 2009: 18f.) which traditionally can be divided in three contrastive sets of vowels, i.e. front vs. central vs. back, on the basis of their place of articulation as in Tarok. Similarly, a two-way distinction [±back] rather than a three-way distinction, i.e. front vs. central vs. back is equally used in Kutep as the language does

not contrast rounded and unrounded central vs. back vowels. Kutep vowels can be distinctively described as in (62).

(62)

[-back]	[+back]			
[-round]	[-round]	[+round]		
i	ɨ	u	[+high]	
e		o	[-high]	
œ				
	a			[+low]

From a formal perspective, Kutep, as Tarok, is characterized as CIR Type IIIb as The VRED agrees in [αplace] with the V_1STEM. The VRED is solely modified by the V_1STEM. It is observed from (60) that the RED is C*i*- for stems with front vowels, or comprising a biphonemic palatalized onset (60a). For stems with a central vowel, the RED is C*ɨ*- (60b). For stems comprising back vowels or a biphonemic labio-velarized onset, the RED is C*u*- (60c). However, unlike in Tarok where the labio-velar glide is never copied along with the C_1STEM, in Kutep it is copied in the RED in case the C_1STEM is a coronal, as opposed to velars which block its copying (60c). An alternative analysis will be to consider that in the underlying representation, labio-velarized velars are biphonemic, while labio-velarized coronals are monophonemic. The first alternative is preferred as this work provide sufficient empirical data to sustain the claim according to which cross-linguistically, coronals and front vowels as opposed to velars, labials, and back vowels constitute natural classes. Along the same line, it is observed that C_1C_2 sequences reduplicate as C_1 (cf, 65a). It is observed within reduplicatives derived from existing simplexes that the RED bears a tone similar to that of the stem-initial CV. The rule in (63) depicts the various contexts in (60) which condition the RED, and (64) provides a sample of derivation.

(63a)

I[+high] →
- i[-back]/ { __ CV[-back] ; __ C*j* } (61a)
- ɨ[+back, -round] /__ CV[+back, -round] (61b)
- < w > u[+back, +round] / { __ CV[+back] ; __ C[+grave]*w* } (61a)

(64) Derivation

Underlying Form		CIR rule	Rule in (63)	
/pìnn/	'fly'	pI-pìnn	pì-pìnn	(61a)
/bjāg/	'be hot'	bI-bjāg	bī-bjāg	
/tàm/	'hide'	tI-tàm	tì-tàm	(61b)
/kwáb/	'try'	kI-kwáb	kú-kwáb	(61c)
/ʧwé/	'agree'	ʧI-ʧwé	ʧwú-ʧwé	

CI-reduplication assumes two functions in Kutep. It is unproductive in the creation of many trisyllabic nouns (65a) and very productive in deriving nouns expressing action, quality and state[29] (65b), cf. also (61). Trisyllabic reduplicatives in (65a) are structured as follows: noun class prefix + RED + Simplex.

(65) Kutep

a. Lexicalized nouns (Koops 2009: 96)

RedF	Gloss	Simplex
á-bú-búnn	shells	?? bunn
kí-sí-sæ̀n	ant species	?? sæn
kù-ʧwù-ʧwùb	owl	?? ʧwub
á-mí-mjím	scars	?? mjim
kú-ʧí-ʧēb	festival	?? ʧeb
kú-bú-bōŋ	bell	?? boŋ
á-sí-skìr	tiny fish	?? skir

b. Action and stative nouns

RedF	Verb	Gloss
bū-bōm	< bōm	be strong
pù-pwèn	< pwèn	count
kì-kà	< kà	go

CI-reduplication is also found in Beezen[30] another marginalised and highly endangered Jukunoid language spoken in one village called Beezen in Western Cameroun (Viktoria

[29] Koops (2009: 21) claims that verbs are often reduplicated to emphasize ongoing actions; he refers interested readers to chapter 9 for more illustration certainly. However, in chapter 9 in general and in section 9.2.2.2 entitled 'ongoing action: Imperfective', CI-reduplication is mentioned nowhere. Thus, based on the glosses he provides 'VERB-ing', I have decided to consider the forms in (61) and (65b) as deverbal nouns expressing action, quality and state

[30] Source: http://dobes.mpi.nl/projects/bezen/project/

Kempf and Roland Kießling, p.c.). From a formal point of view (taking into account that studies on Beezen are ongoing), it seems CIR in Beezen is of the Type IIIc pattern, the subcategory where the RED allomorphy is conditioned essentially by the V_1STEM. It could be ranged later under CIR type IIIb if additional data show that labio-velarized and/or palatalized C_1STEM also affects the VRED. Beezen reduplication looks more complex than that of any other language examined so far. The last entry in (66) seems to undergo sumultaneaously total reduplication (or repetition) and CI-reduplication twice. From a functional perspective, at first sight, there is no doubt that CIR serves intensification.

(66) Beezen (Viktoria Kempf, p.c.)

RedF	Gloss	Simplex	Gloss
kûkʊ́n	very fit	< kún	fit
gbʊ̄gbɔ̄ŋ	very open	< gbʊ̄ŋ	open
kʌ̀b kɨ̄-kɨ̄-kʌ̀b	very old	< kʌ̀b	be old

3.3.4. Cross River: Obolo

Consider the following Obolo data.

(67) Obolo (Rowland-Oke 2003: 294ff.): Fossilization

a. Stems with high vowels

RedF	Gloss	Verb
mí-mín	nail	?? min
ʤí-ʤím	pity	?? ʤim
rù-rú	profit	?? ru
tú-tùt	crustacean	?? tut

b. Stems with non-grave onsets and non-high vowels

ʧì-ʧá	enemy	?? ʧa
jì-jòːk	armpit	?? joːk
ʤí-ʤá	broom	?? ʤa

c. Stem with grave onsets and non-high vowels

RedF	Gloss	Verb	Gloss
gwù-gwá	sacrifice	?? gwa	
kpù-kpó	falcon	?? kpo	
gù-gó	bridge	?? go	
bù-bèːk	case	?? beːk	
wù-wà	plenty	< wà	be plenty

d. Stem with non-grave onsets and non-high vowels but with C*u*- as RED

ʤù-ʤā	broom	< ʤǎːŋ

e. Stems with grave onsets and non-high vowels but with C*i*- as RED

kí-kēːk	lign, brand	?? keːk	
kí-kéːk	memory	< kéːk	remember
bí-bâːŋ	woman	?? baːŋ	
gī-gāŋ	fish species	?? gāŋ	

ANALYSIS

There are six underlying vowels in Obolo (cf. Faraclas 1983: xf) which can be divided in two contrastive sets of vowels, high vs. non-high, on the basis of their height. These vowels can be further distinguished depending on their roundedness as illustrated in (62).

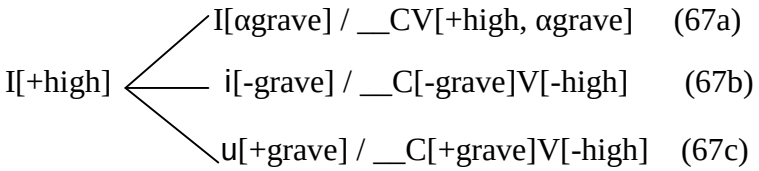
(68)

[-round]	[+round]	
i	u	[+high]
e	o	[-high]
a	ɔ	

Synchronically, available data on Obolo makes it a difficult task to account for the phenomenon of CIR as no rule neatly captures without exception(s) the different contexts conditioning the RED allomorphy. Notwithstanding, one observes in (67) that The RED alternates between C*i*- and C*u*-. Generally, the RED is identical to the stem-initial CV if the latter comprises a high vowel (67a). If the C_1STEM is non-grave, i.e., a coronal consonant, the RED is C*i*- (67b). If the C_1STEM is grave, i.e., a bilabial, a labio-velar or a velar consonant, the RED is C*u*- (67c). However, some exceptions to the rules are found. (67d) provides an example of stem with a coronal onset, with C*u*- as the RED rather than C*i*-. Obolo also has

stems with labial or velar onsets with C*i*- as the RED instead of C*u*- (67e). (68) attempts a formalization of what could be/have ben the rule conditioning the RED allomorphy in Obolo.

(68)



From the foregoing discussing, it is clear that Obolo qualifies as CIR Type $IIIa_{(ii)}$. Assignement to the Type $IIIa_{(ii)}$ is clear since the presence of a high vowel within a given stem always seems to assimilate the VRED. It is also observed, in some instances (67b-e), that the graveness of the stem-initial consonant also influence the RED in cases the V_1STEM is non-high.

From a formal perspective, CIR is used in inflection to mark simultaneously verb plurality (pluractional) and intensification (69a), and to intensify demonstrative pronoun (69b). Few nouns (general) are derived from verbs via CIR (69c). Many lexical items, adjectives (69d), verbs (69e) and nouns (69f) mirror traces of CI-reduplication. The process is no more productive because, synchronically, the stems are not related to any existing lexeme in Obolo.

(69) Obolo (Rowland-Oke 2003 and Faraclas 1983)

a. Verb plurality and intensification (Rowland-Oke 2003: 256)

RedF	Verb	Gloss
kwù-kwé:k	< kwé:k	sit
kì-kékê	< kékê	stand up
tì-tí:ŋ	< tĭ:ŋ	gather
bù-bá:ŋ	< bá:ŋ	spread

b. Intensified demonstrative pronoun (Rowland-Oke 2003: 305f.)

ʧí-ʧí	< ʧí	these one
bí-bí	< bí	them, they

c. Nouns (general) (Faraclas 1983: 5)

gwù-gwá	sacrifice	< gwá	sacrifice
bú-bót	earth	< bót	mound earth
rí-róm	divination	< róm	make a charm

d. Fossilized adjectives (Rowland-Oke 2003: 181)

kú-két	white	?? ket
fí-fít	black	?? fit
ʤí-ʤòːŋ	fresh, alive	?? ʤoːŋ
kpú-kpèm	green (vegetables)	?? kpem

e. Fossilized verbs (Rowland-Oke 2003: 312, 330, 346)

gù-gólék	be prideful	?? golek
sì-sáːk	disturb	?? saːk
sì-sík	shake	?? sik
kpù-kpɔ́t	roll	?? kpɔt

f. Fossilized nouns (Rowland-Oke 2003: 295ff.)

ǹ-rú-rút	window	?? rut
ŋ̀-gí-gàŋ	fish	?? gaŋ
ǹ-rì-rjèŋ	hippopotamus	?? rjeŋ
ò-lù-lút	bile	?? lut
ò-ɲí-ɲá	cat	?? ɲa
è-bí-bâːŋ	woman	?? baːŋ

3.3.5. Bantoid

3.3.5.1. Vengo [Babungo]

Consider the Vengo data in (70) paying attention to the quality of the VRED in comparison with that of the V_1STEM.

(70) Vengo (Schaub 1985: 353ff.)

a. Progressive aspect

H-verbs: bwéy‘sleep’, sáŋ ‘beat’, kúːnə́ ‘return home’, ɲɔ́ŋsə́ ‘suckle, breastfeed’

RedF	Gloss	Perfective forms	Gloss
˩*bí*-˩bwéy	is sleeping	< ˩bwéy	slept
˩*sí*-˩sáŋ	is beating	< ˩sáŋ	beat
˩*kí*-˩kúːnə́	is returning	< ˩kúːnə́	returned
˩*ɲí*-˩ɲɔ́ŋsə́	is suckling	< ˩ɲɔ́ŋsə́	suckled

L-verbs: bwèy ‘live’, fée ‘fear’, nə́ʔnə́ ‘shake’, fésə́ ‘frighten’

ˈ*bí*-bwéy	is living = is alive’	< bwêy	lived
ˈ*fí*-ʃéː	is fearing	< ˈféː	feared
ˈ*ní*-nə́ʔˈnə́	is shaking	< *nə́ʔnə̀*	shook
ˈ*fí*-ʃə́ˈsə́	is frightening	< fə́sə́	frightened

b. Verb intensification (Schaub 1985: 218)

RedF	Gloss	Verb	Gloss
bí-báj	become too red	< bàj	become red

ANALYSIS

CIR in Vengo is of the Type Ib pattern. It consists of repeating the initial consonant (complex onsets do not reduplicate) of the verb root followed by the unvariable central vowel [*ɨ*]. The RED always bears a downstepped high (Schaub 1985: 353) except from the progressive construction in (70b)[31], where the RED bears a high tone.

CI-reduplication in Vengo serves two distinct functions (Schaub 1985: 217f., 353ff.): to mark progression of dynamic actions (70a) and to intensify stative verbs (70b).

3.3.5.2. Isu

Consider the following Isu data comparing the VRED with the V_1STEM.

(71) Isu (Kießling 2012: 10f.): Intensive verbal adjectives/ Frozen nouns

a. Stems with unrouded vowels

RedF	IPF verbal form	Gloss	Source	Gloss
tɨ̂-ɪɛ́bə́	tɛ́bə́	be small	< tɛ́b	small
dɨ̂-dʌ́də̀	dʌ̀də̀	be heavy	< dʌ̀d	heavy
ɣɨ̂-ɣáʔá	ɣáʔá	be fat	< ɣáʔ	fat
dɨ̂-díjɛ̀	-	be huge	< dìjɛ̀	huge
dzɨ̂-dzə́ː	dzə́ː	be dirty	< dzə́ː	dirty
sɨ̀-sɨ̀ə	-	be small	< sɨ̀ə	small

[31](70b) is the only example provided in the source text.

b. Stems with rounded vowels or biphonemic labio-velarized onsets

RedF	IPF verbal form	Gloss	Source	Gloss
bû-buí	-	be soft	< búi	soft
zʊ̂-zʊ́mə́	zʊ́mə́	be dry	< zʊ́m	dry
kə́-bú-bwái		water snake	?? bwai	
kə́-sú-sɔ́ʔɔ́		termite	?? sɔʔɔ	
kə́-vú-vɔ́ŋɔ́		soldier ant	?? vɔŋɔ	

ANALYSIS

Nine vowels are identified in the Isu data in (71). These vowels can be contrastively described as in (72).

(72)

[-back]	[+back]			
[-round]	[-round]	[+round]		
i	ɨ	u	[+ATR]	[+high]
	ə	ʊ	[-ATR]	
	ʌ	o	[+ATR]	[-high]
ɛ	a		[-ATR]	

From a formal perspective, CI-reduplication in Isu is sub-categorized Type IIIc as it appears clearly from the data in (71) that roundedness assimilation is the only factor that governs CIR in Isu. The RED is CI- in shape and its vowel harmonises in height and tenseness when the stem comprises a rounded back vowel. It is oberved in (71) that the RED is C*ɨ*- for stems with unrounded vowels (71a); C*ʊ*- for stems with the rounded, non-tense vowel [ʊ], and C*u*- for stems with any rounded vowels different from [ʊ]. The rule determining the VRED quality in Isu is formalized as in (73).

(73)

I[+high] ⟨ ɨ[+back, -round]/ __CV[-round] (71a)

u [+round, +ATR] / __ CV[+round]

ʊ [+round, -ATR] /__ C[+round, +high, -ATR] (71a)

(74) Derivation

Underlying Form		CIR rule	Rule in (73)	
/dìjɛ̀/	'huge'	dI-dìjɛ̀	dî-díjɛ̀	(71a)
/sɨ̀ə/	'small'	sI-sɨ̀ə	sî-sɨ̀ə	
/tɛ́b/	'small'	tI-tɛ́bə́	tî-ɪɛ́bə́	
/zʊ́m/	'dry'	zI-zʊ́m	zû-zʊ́mɛ́	(71b)
/búi/	'soft'	bI-búi	bû-búi	
/sɔʔ/		sI-sɔ́ʔɔ́	sû-sɔ́ʔɔ́	'termite'
/buái/		bI-buái	bû-bwái	'water snake'

CI-reduplication is used to intensify verbal adjectives denoting the state of something (75a). Several instances of lexicalization are also found in Isu (75b).

(75) Isu (Kießling 2012: 10f.)

a. Intensive verbal adjectives

RedF	IPF verbal form	Gloss	Source	Gloss
bû-buí	-	be soft	< búi	soft
dî-díjɛ̀	-	be huge	< dìjɛ̀	huge
zʊ̂-zʊ́mə́	zʊ́mə́	be dry	< zʊ́m	dry
dzî-dzə́ə	dzə́ə	be dirty	< dzɨ́	dirty
fî-ɟʌ́ˡmə́	fʌ̀mə̀	be white	< fʌ̀m	white
bî-bɛ́bə́	bɛ́bə́	be bad	< bɛ́b	bad

b. Lexicalized nouns

RedF	Gloss	Source	Gloss
kə́-tsɨ́-*tsàʔá*	clod of soil, lump of earth	< í-*tsáʔ*	clay
kə́-vú-vɔ́ŋɔ́	soldier ant	?? vɔŋɔ	
kə̀-dzɨ̀-dzə̀	fly	?? dzə	
kə́-bú-bwái	water snake	?? bwai	
kə́-fú-fú	tortoise	?? fu	
kə́-ndzú-ndzúə́	toad	?? ndzuə	
kə́-sɨ́-sí	sand, sandy place	?? si	
m-gbɨ́-ŋgbáŋ	brain	?? ŋgbaŋ	

Instances of lexicalized nouns and adverb formation are also attested in Zhoa (Kießling 2012: 9), a West Ring language spoken in a village in the North West Region of Cameroon. Zhoa counts among the two unclassified languages as far as CIR formal patterns are concerned as

more data is needed to attempt any convincing account of CIR. Examples of reduplicatives derived from stems with back vowels are required to see which forms the RED takes in these contexts.

(76) Zhoa (Kießling 2012: 9): Lexicalized nouns and adverb formation

RedF	Gloss	Source
kə́-sí-*sí?ə́*	ant species	?? sɪʔə
kə́-sí-sâlə̀	whip's mark	?? salə
*ǹdzì-*ndzʌ̀m	really, truly	?? ndzʌm

3.3.5.3. Fe'fe'

Consider the data in (77) from Hyman 1972, 1973 paying a close attention to the quality of the RED in comparison with the stem-initial CV.

(77) Fe'fe' (Hyman 1972/73: 100/333f): Restrictive/Continuous aspect

a. Stems with high vowels

RedF	Gloss	Verb	Gloss
si-sii	spoil only and continuously	< sii	spoil
pi-pii	profit only and continuously	< pii	profit
ku-kuu	carve only and continuously	< kuu	carve

b. Stems with [-grave] onsets and front non-high vowels

ʧī-ʧɛ̄n	moan only and continuously	< ʧɛ̄n	moan
tī-tā*ʔ*	bargain only and continuously	< tā*ʔ*	bargain
tī-tē:	remove only and continuously	< tē:	remove

c. Elsewhere

pī-*pī-*peė	hate only and continuously	< peė	hate
ɣǐ-*ɣǐ-*ɣɛ̀n	go only and continuously	< ɣɛ̀n	go
kɨ-kaʔ	grill only and continuously	< kaʔ	grill
mɨ-mo	kill time only and continuously	< mo	kill time
tɨ-tɔh	be severe only and continuously	< tɔh	be severe
ʧɨ-ʧo	fall only and continuously	< ʧo	fall
kɨ-ko	take only and continuously	< ko	take
pɨ-pɔh	be afraid only and continuously	< pɔh	be afraid

ANALYSIS

There are 10 underlying vowels in Fe'fe' (cf. Hyman 1972: 32) divided on the basis of their place of articulation, and height (78).

(78)

[-back]	[+back]		
[-round]	[-round]	[+round]	
i	ɨ	u	[+high]
e	ɤ	o	[-high]
ɛ		ɔ	
a			

From a formal perspective, CI-reduplication in Fe'fe is sub-categorized Type $IIIa_{(ii)}$ as it appears clearly from the data in (77) that height assimilation coupled with the degree of graveness of the C_1STEM are the major factors conditioning the VRED. The RED is CI- in shape and it harmonises in backness and graveness with the stem-initial CV. A curiosty with the Fe'fe' CI-reduplication system is that the vowel [a] shares the same properties with traditional front, non-high vowels [e, ɛ]. It is observed in (77a) that the RED is identical to the stem-initial CV when it comprises a high vowel. For stems with front, non-high vowels, the RED is C***i***- when the C_1STEM is a non-grave consonant (alveolar or palatal) (77b), and C***ɨ***- elsewhere (77c). The rule determining the appropriate RED allomorph is formalized as in (79).

(79)

ɨ[+high, +back, -round] →

- **I**[αPlace, αPlace] / __CV[+high, αPlace, αround] (77a)
- ***i***[-grave, -round] / __ C[-grave] V[-high, -back] (77b)
- ***ɨ***[αfeature] / elsewhere (77c)

(80) Derivation

Underlying Form		CIR rule	Rule in (79)	
/sii/	'spoil'	sɨ-sii	si-sii	(77a)
/kuu/	'carve'	kɨ-kuu	ku-kuu	
/tāʔ/	'bargain'	tɨ-tāʔ	tī-tāʔ	(77b)
/peė/	'go'	pɨ-peė	pī-peė	(77c)
/kaʔ/	'grill'	kɨ-kaʔ	ki-kaʔ	

CI-reduplication is used in Fe'fe' to derive nouns from other existing nouns (81a) and verbs (81b), agent nouns from action verbs (81c). Several instances of frozen nouns are also found (81d). CI-reduplication is used productively to mark simultaneously restriction and continuity (Sadembouo 2012: 170) (81e), see (77) also.

(81) Fe'fe' (Sadembouo 2012: 168ff.)

a. Nouns derived from nouns

RedF	Gloss	Noun	Gloss
ntɨ̀-ⁿtɔ̀h	swamp	< tɔ̀h	mud
ʧì-ʧàh	the misdt of	< ʧàh	the midst
kɨ̀-kàm	short	< kàm	piece of smt.

b. Nouns derived from verbs

RedF	Gloss	Verb	Gloss
ndí-ndē:	truth	< ndé:	be clear
pɨ̀-pɛʔ	good (n)	< pɛ̀ʔ	be good
sɨ̄-sāʔ	sprout	< sāʔ	germinate
tɨ̄-ɪ̄ō	statue	< tō	to sculpt

c. Agent nouns

RedF	Gloss	Verb	Gloss
ǹzɨ̄-zɤ̆	the one eating only and continuously	< zɤ̄/nzɤ̆[32]	eat
m̀bɨ̄-pŭ	the one making only and continuously	< pɨ̄/mbɨ̄	make
m̀bhɨ̀-phì	the one sowing only and constinuously	< phì/mbhí	

d. Lexicalized nouns

RedF	Gloss	Simplex
tì-tē	yard	?? te
kì-kɛ̄n	carelessness	?? kɛn
ndɨ̀-ⁿdɤ̄m	alligator pepper species	?? ndɤm
kɨ̀kām	strawberry	?? kam

[32] The verb in Fe'fe' has two forms: an unmarked form characterizing the imperative and completed aspects, and a marked form made up of a homorganic nasal prefix /N/ followed by the verb stem which characterizes non-completed and consecutive aspects, Hyman (1972: 45). Take note that the afixation of this homorganic nasal in certains context effects the initial consonant of the verb stem as illustrated in (81c).

e. Restrictive/Constinuous aspect

RedF	Gloss	Verb	Gloss
ʤɯ̆-ʤɔ̀	sing only and continuously	< ʤɔ̀	sing
jī-jām[33]	grow only and continuously	< jām	grow
jī-jósí	bless only and continuously	< jósí	bless
t***ī-***tō	punch only and continuously	< tō	punch
j***ɨ̆-***jɔ̀	sing only and continuously	< jɔ̀	sing

3.3.5.4. Bafut

Consider the Bafut data in (82) paying attention to the VRED comparing it with the V_1STEM.

(82) Bafut (Tamanji 2009: 207, 2012: 59): Lexicalized nouns

RedF	Gloss	Simplex
à-*tsɨ́-*tsáʔà	mud	?? tsaʔa
à-*sɨ́-s*áŋ	sugar cane	?? saŋ
à-*lɨ́-*lə́ː	bat	?? ləː
à-*kɨ̀-*kúŋ	owl	?? kuŋ
à-*kɨ́-*kə́ː	insect species	?? kəː
à-*lɨ́lə́ŋ*	shadow	?? ləŋ
à-*kɨ̀-*kóʔò	dumb person	?? koʔo

ANALYSIS

CI-reduplication in Bafut is of the Type Ib pattern. The RED comprises a copy the C_1STEM followed by the high central unrounded vowel [ɨ] (Tamanji 2009: 207 and 2012: 59).

CI-reduplication is unproductive in Bafut. Very few fossilized nouns show traces of CIR (cf. (82)). Reduplicatives belong to gender 7/8 (Tamanji 2009: 207, 2012: 59).

3.3.5.5. Narrow Bantu: Makaa

Consider the following Makaa data drawn from Ibirahim 2013, compring the RED and the stem-initial CV for each example.

[33]The bolded examples are part of the data collected from Etienne Sadembouo on January 19th, 2012. The intention was to get a clear idea of the behavior of initial-palatal consonant verb stems when CIR applies.

(83) Makaa (Ibirahim 2013: 278ff.): Diminutives

a. Stems with high vowels

RedF	Gloss	Noun	Gloss
ʃì-ʃílə́	small girl	< ʃìlə̀	girl
lɨ́-lɨ́ː	small tree	< *lɨ́ː*	tree
fɨ́-fɨ́ŋ-ú	small wound	< *fɨ́ŋ*	wound
dʒù-dʒŭː	small thigh	< dʒùː	thigh

b. Stems with labio-velarized or the labio-velar glide as onsets

bú-bwɛ́nʒá	small tree species	< bwɛ̀nʒà	tree species
ntʃú-ntʃwə́má	small young man	< ntʃwə́má	young man
wú-wólɛ́	small case	< wólɛ̀	case
wù-wă:g-ú	small chimpanzee	< wà:g	chimpanzee

c. Stems with palatalized consonant or the palatal glide as onsets

fí-fjáŋ-ú	small soup	< fjáŋ	soup
mpí-mpjə́	small dog	< mpjə̂	dog
jí-jén-ú	small mirror	< jên	mirror
jí-jóːmb-ú	small leaf powder	< jóːmb	leaf powder

d. Stems with simple onsets followed by non-high vowels

tʃɨ́-ɪʃénd-ú	small change	< tʃénd	change
mɨ̀-mɛ́jɛ́	small sculptor	< mɛ́jɛ́	sculptor
dʒɨ̀-dʒə́	small tooth	< dʒə̀	tooth
dɨ́-dáːgə́	small crab	< dáːgə́	crab
zɨ́-ʒòːlú	small pangolin	< zòːlú	pangolin

ANALYSIS

There are nine underlying vowels in Makaa (cf. Ibirahim 2013: 261) which can be distinvtively described as in (84).

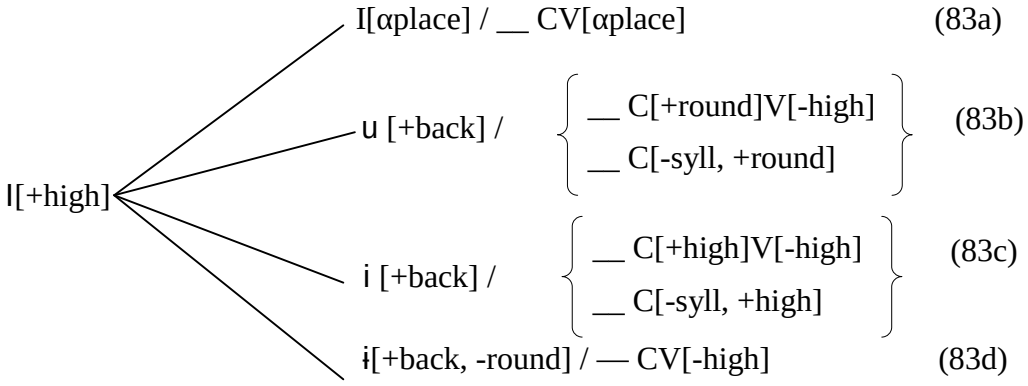
(84)

[-back]	[+back]			
[-round]	[-round]	[+round]		
i	ɨ	u	[+ATR]	[+high]
ɪ			[-ATR]	
e	ə	ɔ	[+ATR]	[-high]
ɛ	a		[-ATR]	

The features [high], [back], [round], and [ATR] are sufficient enough to contrast Makaa vowels as they help to mark the distinction between the two major sets of vowels in (83) which condition the VRED allomorphy, i.e. high vs non-high; to mark the distinction in tenseness and roundedness between the three high vowels Makaa counts. CI-reduplication in Makaa is thus ranged under Type $IIIa_{(i)}$ as height assimilation, as observed in (83), is the major factor conditioning the VRED change.

It is observed in (83) that the VRED assimilates place features from the C_1STEM if the latter is high (83a). For stems withs non-high vowels, the RED is never identical to the stem-initial CV. The RED is C*u*-, if the C_1STEM is a labio-velarized consonant or the lavio-velar glide [*w*] (83b); C*i*-. if the C_1STEM is a palatalized consonant or the palatal glide [*j*] (83c). Finally, The RED is C*ɨ*- if the stem comprises a C_1STEM different from the aforementioned cases followed by a non-high vowel (83d). The aforementioned contexts can be formalized as in (85).

(85)



Concerning reduplicatives tonology, the RED underlying form is toneless and it acquires its tone as follows: if the simplex is H or HL, the RED is H. If the simplex is L or toneless, the RED is L. If the simplex is LH, the RED bears a H polar tone (Ibirahim 2013: 284). These rules can be verified troughout (83) and (83a, c-e). Verbal adjectives (83b), however, present a deviant behavior. The RED always bears a H which has no effect on L or toneless root but changes initial-H root to L.

Based on tonal melody, suffixes supporting reduplicated forms, makaa counts three distinct formal patterns associated to CIR functions as summarized in (86) and exemplified in (87).

(86)

Formal patterns	Function
CI…ú	diminutive
CÍ…î	verbal adjective
CI	lexical formation

Makaa uses CIR to generate new lexical entries such as nouns (no more productive for frozen nouns) (87a), adjectives describing the state of someone or something (87b), pure adjectives (87c), adverbs (87d) and diminutives (87e) from other known grammatical units (Ibirahim 2013: 277ff.).

(87) Makaa (Ibirahim 2013: 277ff.)

a. Noun formation

Productive noun formation

RedF	Gloss	Noun	Gloss
*zí-*zàːmə́	leper	< zàːmə́	leprosy
kú-kúm	wealthy person	< kúm	wealth
*kí-*kéɲ	baby	< kéɲ	baby
ʃú-ʃúːmbú	wizard	< ʃúːmbú	sorcery

Lexicalized nouns

bú-bwàdə̂	cap		?? bwadə
mbú-mbúːg	disabled (n)		?? mbuːg
*sì-s*àːlɛ̂	exception		?? saːlɛ
lù-lwàːmb	tree species		?? lwaːmb

b. Adjectives describing the state of something or someone

RedF	Gloss	Verb	Gloss
mbú-mbùd-î	lain	< búdòw	lie on one's face
kú-kùd-î	squatted	< kùdòw	squat
*fí-*ʃə̀l-*î*	mixed	< fə̀là	mix
fú-*fùgìl-î*	chewed	< fúgàl	chew

c. Lexicalized adjectives

ntʃù-ntʃúmbə̀	new	?? ntʃumbə
gú-gwâːn	new	?? gwaːn
bí-bíjá	small	?? bija

d. Adverbs

*tí-*ɪ́ám	in the midst	< tâm (ADV.)	midst
kù-kúg	suddenly	< kúg (N)	miracle
*tí-*ɪ̀ógú	slowly, softly	?? togu	
*fí-*ʃâl	speedily	?? fal	

e. Diminutives

RedF	Gloss	Noun	Gloss
*bì-*bóːg-ú	small hoe	< bòːg	hoe
bù-búd-ú	small glade	< bùd	glade
dʒú-dʒwóːnz-ú	small palm	< dʒwóːnz	palm
jí-*jídígú*	small darkness	< *jídígú*	darkness
*kí-*kə́l-ú	small voice	< kə̀l	voice
kú-kwáːdə́	small village	< kwáːdə́	village
*lì-*lə́ŋá	small container	< lèŋà	container
lú-lwíy-ú	small insult	< lwíy	insult
*mbí-*mbɛ́	small door	< mbɛ̂	door
*mpí-mpǐ*ː	small pot	< *mpǐ*ː	pot
ʃì-ʃílə́	small girl	< ʃìlə̀	girl
*tʃí-tʃíŋ-*ú	small neck	< *tʃíŋ*	neck
ʒù-ʒwŏ	small civet cat	< ʒwòː	civet cat

Verbal adjectives (83b) and diminutives (83e) occur with the appended formative vowels [-î] and [-ú][34] respectively. [-î] is always suffixed to all verbal adjectives and its tone never affects the root tonal melody. [-ú] does not occur with vowel-final diminutive stems but its tone remains active and interacts with the root tone. It has no effect on H or LH roots because the two high tones merges, it causes the simplication of HL roots to H, and spreads on all available tone bearing units within toneless roots. For underlying lexical L roots, it fuses with the L of the preceding syllable resulting in LH.

(88) Derivation

Underlying Form		CIR rule	Rule in (85)	
/ʃìlə̀/	'girl'	ʃI-ʃìlə̀	ʃì-ʃìlə̀	(83a)
/ʤùː/	'tigh'	ʤI-ʤùː	ʤù-ʤŭː	
/bwɛ̀nʒà/	'trees species'	bI-bwɛ̀nʒà	bú-bwɛ́nʒá	(83a)
/wólɛ̀/	'suitcase'	wI-wólɛ̀	wú-wólɛ́	
/mpjə̂/	'dog'	mpI-mpjə̂	mpí-mpjə̂	(83c)
/jên/	'mirror'	jI-jên	jí-jénú	
/zòːlú/	'pangolin'	zI-zòːlú	*zí-*zòːlú	(83c)

[34]It is difficult to pinpoint the meaning of these final vowels.

3.3.6. Kwa

CI-reduplication was found so far in Anyin, Abidji, Attié, Akan and Fon. The function of CI-reduplication in Anyin (3.3.6.1) and Attié (3.3.6.2) is not stated clearly by Bogny (2005: 2) whose analysis focuses mostly on the phonology of CIR and less on its semantic functions. He notes broadly that CIR marks plurality, repetition and intensification. Which of the aforementioned function(s) is/are attested in Anyin, or Attié is a question left opened.

3.3.6.1. Anyin

Consider the Anyin data in (89) comparing the VRED with the V_1STEM each time.

(89) Anyin (Bogny 2005:13f.): Semantic function not stated

a. Stems with unrounded vowels

[-ATR]

RedF	Verb	Gloss
kpì-kpɛ́	< kpɛ́	cut
dì-dá	< dá	sleep
tì-tí	< tí	tear/pluck
dì-dí	< dí	eat/graze
kì-ká	< ká	say

[+ATR]

tì-té	< té	explode

b. Stems with rounded vowels

[-ATR]

wʊ̀-wɔ̄	< wɔ́	sting/bite
nʊ̀̃-nʊ́̃	< nʊ́̃	drink

[+ATR]

wù-wú	< wú	die

ANALYSIS

There are 10 underlying vowels in Anyin (cf. Ouattara 2006: 103ff., Ahua 2006: 126f.) which can be described contrastively on the basis of their place of articulation, degrees of roundedness and tenseness (90).

(90)

[-round]	[+round]		
i	u	[+ATR]	[+high]
ɪ	ʊ	[-ATR]	
e	o	[+ATR]	[-high]
ɛ	ɔ	[-ATR]	
a	ʌ		

CI-reduplication in Anyin is of the Type IIIc$_{(i)}$ pattern as the presence of any round vowel within the stem assimilates the VRED in roundedness (cf. (89)). The VRED is always high, agreeing in roundedness and tenseness with the V_1STEM (Bogny 2005: 13). The RED is C*i*-/C*ɪ*- for roots with [-round, αATR] vowels (89a), and C*u*-/C*ʊ*- for roots comprising [+round, αATR] vowels (89b). The RED always bears a L(ow) tone.

(91)

Ì[+high] <
- ì/i̋[-round, αATR]/ __CV[-round, αATR] (89a)
- ù/ʊ̀[+round, αATR]/ __CV[+round, αATR] (89b)

CI-reduplication as depicted in Anyin is attested in Abidji [abi], Kulango (Ngwala) [nku], Abron [abr], Ega [ega] and Nzéma [nzi] (Bogny[35] 2005:15).

Instances of verb intensification were found in Abidji (CIR Type IIIc$_{(i)}$) (Tresbarats 1990:110). As predicted by Bogny (2005: 15), the process governing the choice of the exact RED allomorph looks similar as in Anyin. C*r* onsets undergo simplification and reduplicate as C (92b). In addition to the reduplicative prefix, some verbs in Abidji occur with an additional intensification suffix (Tresbarats 1990:110).

(92) Abidji (Tresbarats 1990:110): Verb intensification

a. Stems with unrounded vowels

[+ATR]

RedF	Gloss	Verb	Gloss
ji-je	teach	< je	show (s.o. smt.)
fi-fie	wash many clothes	< fie	wash

[35]Bogny 2005 attests the presence of CIR in these languages without providing any data.

[-ATR]

kpɪ-kpra	inspect	< kpra	look
pɪ-pa-ʊ	buy many things	< pa	buy

b. Stems with rounded vowels

fʊ-fʊ-ʊ	give many things	< fʊ	give
tʊ-tɔpʊ	send many people	< tɔpʊ	send

(93) Derivation

Underlying Form		CIR rule	Rule in (91)	
/dá/	'sleep'	dÌ-dá	dɪ́-dá	(89a)
/té/	'explode'	tÌ-té	tì-té	
/nʊ̃́/	'drink'	nÌ-nʊ́̃	nÌ-nʊ́̃	(89b)
/wú/	'die'	wÌ-wú	wù-wú	
/kpɪ/	'look'	kpI-kpra	kpɪ-kpra	(92a)
/fie/	'wash'	fI-fie	fi-fie	
/tɔpʊ/	'send'	tI-tɔpʊ	tʊ-tɔpʊ	(92b)

3.3.6.2. Attié

Consider the following Attié data paying a close attention to the VRED in comparison with the V_1STEM.

(94) Attié (Bogny 2005:17): Function not stated in the source

a. Stems with unrounded vowels

RedF	Verb	Gloss
bī-bɤ̀	< bɤ̀	bake
bí-bì	< bí	**blacken**
bī-bʌ̀	< bʌ̀	come
lī-là	< lā	sleep
mī-mjà	< mjā̃	be in a spot
tī-tɛ̃	< tɛ̃	hear

b. Stems with rounded vowels

bū-bò	< bò	shatter
bū-bɔ̀	< bɔ̄	germinate
bú-bù	< bú	**break**
dū-dù̃	< dū̃	wive

ANALYSIS

There are 10 underlying vowels in Anyin (cf. Ouattara 2006: 103ff., Ahua 2006: 126f.) which can be described contrastively on the basis of their place of articulation, degrees of roundedness and tenseness (95).

(95)

[-round]	[+round]		
i	u	[+ATR]	[+high]
ɪ	ʊ	[-ATR]	
e	o	[+ATR]	[-high]
ɛ	ɔ	[-ATR]	
a	ʌ		

CI-reduplication in Attié is of the Type $IIIc_{(i)}$ pattern as it displays similarly as in Anyin and Abidji, i.e. the presence of any round vowel within the stem assimilates the VRED in roundedness (cf. (94)). However, because Attié is not a language with [ATR] harmony, the RED is C*i*- for stems with unrounded vowels (94a), and C*u*- for stems with rounded vowels (94b). See (96) for rule formalizaion. The RED bears a mid tone (M) almost everywhere except for bolded cases where the RED is rather L.

(96)

I[+high] → i[-round]/ __CV[-round] (89a)

I[+high] → u[+round]/ __CV[+round] (89b)

(97) Derivation

Underlying Form		CIR rule	Rule in (96)	
/dá/	‘sleep’	dÌ-dá	dɨ́-dá	(89a)
/té/	‘explode’	tÌ-té	tì-té	
/nʊ́̃/	‘drink’	nÌ-nʊ́̃	nÌ-nʊ́̃	(89b)
/wú/	‘die’	wÌ-wú	wù-wú	

3.3.6.3. Akan

Consider the following Akan data paying attention to the RED shape, onset, and nucleus.

(98) Akan (Akuapem) (Schachter & Fromkin 1968: 157ff.): Pluractional/ frozen verbs

a. Stems with high oral vowels

RedF	Gloss	Verb	Gloss
si-siʔ		< siʔ	stand
fɪ-fɪʔ		< fɪʔ	vomit
bu-bu(ʔ)		< bu(ʔ)[36]	bend

b. Stems with high nasal vowels

tĩ-tĩʔ	< tĩʔ	scratch
sĩ-sĩ(ʔ)	< sĩ(ʔ)	hang on
sũ-sũ	< sũ	cry

c. Stems with (non-high) front vowels

si-seʔ	< seʔ	say
ʧᶣi-ʧᶣəʔ	< ʧᶣəʔ	cut
sɪ-sɛʔ	< sɛʔ	resemble
sɪ-saʔ	< saʔ	cure

d. Stems with (non-high) back vowels

su-soʔ	< soʔ	seize
sʊ-sɔʔ	< sɔʔ	light

e. Stems with C^{w}or *w* as onset

RedF	Gloss	Simplex	Gloss
fʷu-fʷæwʔ	chip	?? fʷæ(w)ʔ	
kʷʊ-kʷawʔ	rub off	?? kʷa(w)ʔ	
wʊ-wari(ʔ)	be tall	?? war(i)(ʔ)	

f. (Initial) CVN stems

fĩm-fɛmʔ	< fɛmʔ	lend
tʊñ-tʊnʊ(ʔ)	< tʊnʊ(ʔ)	forge
kĩŋ-kaŋʔ	< kaŋʔ	count

[36]Forms with final glottal stop in parentheses show dialect variation.

g. C*ã*N/C stems

m*ĩ*-mã(ʔ)	< mã(ʔ)	give
n*ĩ*m-nãmʔ	< nãmʔ	hang on
k*ɪ*-kã(ʔ)	< kã(ʔ)	say
s*ɪ*-sãʔ	< sãʔ	tie up

ANALYSIS

There are 10 underlying vowels in Akan (cf. Schachter & Fromkin 1968: 25) which can be described contrastively on the basis of their place of articulation, height, degrees of roundedness and tenseness (99).

(99)

[-back]	[+back]			
[-round]	[-round]	[+round]		
i		u	[+ATR]	[+high]
ɪ		ʊ	[-ATR]	
e	ə	o	[+ATR]	[-high]
ɛ		ɔ	[-ATR]	
a				[+Low]

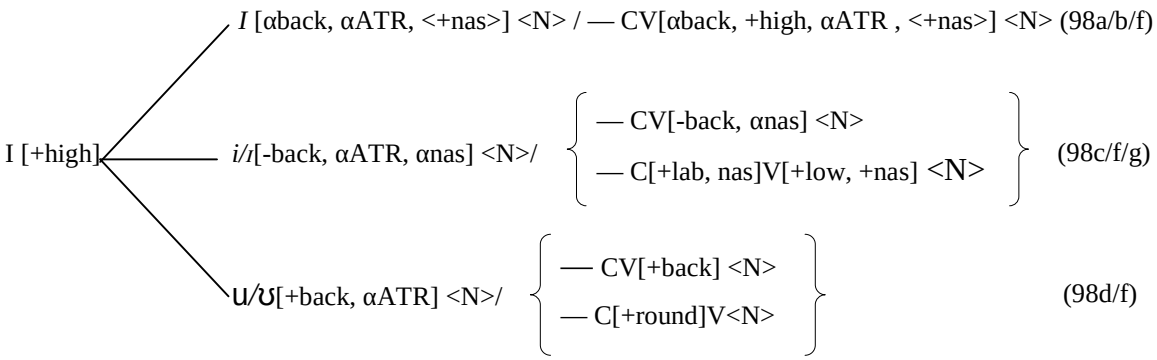
CI-reduplication in Akan belongs to the Type III$c_{(ii)}$ pattern as the presence of any round segment at the stem-initial position or as its nucleus triggers the VRED roundedness/backness assimilation. The VRED in Akan is always high agreeing in tenseness and backness with the V_1STEM (cf, (98)). If the stem comprises a high oral (98a) or nasal vowel (98b), the RED is identical to the stem-initial CV. The RED is C*i*-/C*ɪ*- for roots with [-back, αATR] vowels (98c) and C*u*-/C*ʊ*- for roots comprising a [+back, αATR] vowel (98d).

Though the VRED in Akan agrees in backness and tenseness with the V_1STEM, it should be noted that the formal characteristics of CIR in Anyin, Abidji and Attié also hold in Akan. In other words, from a typological perspective, one can also argue that the RED in Akan is C*i*-/C*ɪ*- for roots with [-round, αATR] vowels, and C*u*-/C*ʊ*- for roots comprising a [+round, αATR]. However, contrary to Anyin, Attié and Abidji where the RED is solely conditioned by the V_1STEM, Akan has clear cases of C_1STEMs influencing the VRED. Labio-velarized consonants and the labio-velar glide [*w*] turn the VRED to [*u*] rather than [*ɪ*] (98e) regardless of the V_1STEM. Complex onsets (C^W, $C^ɥ$) reduplicate in Akan as single consonant. $C^ɥ$ clusters have no incidence on the VRED.

The RED is generally CV- in shape. Yet, if the verb stem-initial syllable ends in a nasal consonant, the RED is CVN in shape (98f), in this case the VRED is always nasalized. If the stem vowel is [*ã*], the VRED is nasalized if and only if the C_1STEM is a nasal consonant (98g). Regardless of the stem inherent tone[37], the RED bears a L and the V_1STEM changes to H (Schachter & Fromkin 1968: 157ff.).

The general rule for CI-reduplication in Akan, according to Schachter & Fromkin (1968: 157ff.), can be formalized as in (100).

(100)



(101) Derivation

Underlying Form		CIR rule	Rule in (100)	
/sìʔ/	‘stand’	sÌ-sìʔ	sì-síʔ	(98a)
/bù/	‘bend’	bÌ-bù	bù-bú	
/*tɪ̃̀ʔ*/	‘scratch’	tÌ-*tɪ̃̀ʔ*	*tɪ̃̀-tɪ́ʔ*	(98b)
/sàʔ/	‘cure’	sÌ-sàʔ	sì-sáʔ	(98c)
/ʧᶣàʔ/	‘cut’	ʧᶣÌ-ʧᶣàʔ	ʧᶣì-ʧᶣáʔ	
/sɔ̀ʔ/	‘light’	sÌ-sɔ̀ʔ	sʊ̀-sɔ́ʔ	(98d)
/wàr/		wÌ-wàr	wù-wár ‘be tall’	(98e)
/kàŋʔ/	‘count’	kÌ-kàŋʔ	kɪ̃-káŋʔ	(98f)
/mà˞/	‘give’	mÌ-mà˜	mɪ̀-má˜	(98g)
/sà˞ʔ/	‘tie up’	sÌ-sà˞ʔ	sɪ̀-sá˞ʔ	

CI-reduplication is used productively in Akan to mark multiple activity or multiple state (pluractional) (101a). A small number of lexical verbs in Akan are obtained via CIR (101b) (Schachter & Fromkin 1968: 155f.).

[37]Schachter & Fromkin 1968 leave out tones in their transcriptions.

(102) Akan[38] (Schachter & Fromkin 1968: 159ff.)

a. Pluractional (multiple activity)

Lects	RedF	Verb	Gloss
Ak-Fa[1]	hɪ-haw?	< haw?	trouble
As-Fa[2]	hɪ-ha?	< ha?	
Fa	bɪ-bar?	< bar?	cover
Ak-As	bɪ-barɪ(?)	< barɪ(?)	
Fa	hʊ-hʊr?	< hʊr?	wash
Ak-As	hʊ-hʊrʊ(?)	< hʊrʊ(?)	
Fa	fɪ-far?	< far?	take
Ak-As	fɪ-fa?	< fa?	
Ak-As-Fa	fĩm-fɛm?	< fɛm?	lend
Fa	tʊñ-tʊn?	< tʊñ?	forge
Ak-As	tʊñ-tʊnʊ̃(?)	< tʊnʊ̃(?)	
Ak	kĩŋ-kaŋ?	< kaŋ?	count
As	kĩŋ-kaĩ̃	< kaĩ̃	
Fa	kĩŋ-kaŋ?	< kan?	

b. Lexicalized verbs

Lects	RedF	Gloss	Source
Ak-Fa[1]	fwu-fwæw?	chip	?? fwæ(w)?
Fa[2]	fwu-fwæ?		
Ak-Fa-As	gwu-gwæ?	skin	?? gwæ?
	hw̃ũ-hw̃æ̃?	scrape	?? hw̃æ̃?
Ak-Fa[1]	kwʊ-kwaw?	rub off	?? kwa(w)?
As-Fa[2]	kwʊ-kwa?		
	swu-swæ?	be small	?? swæ?
Ak-As	wʊ-wari(?)	be tall	?? war(i)(?)
Fa	wʊ-war?		

[38]Fa[1] and Fa[2] represent sub-dialects of Fante.

3.3.6.4. Fon

Consider the following data from Fon[39] comparing the quality of the VRED with that of the V1STEM.

(103) Fon: Action nouns

a. Default RED

Lefebvre & Brousseau (2002: 197)

RedF	Verb	Gloss
zì-zɛ̀	< zɛ̀	split
gbì-gbá	< gbá	build
xì-xɔ̀	< xɔ̀	buy
kí-kó	< kó	laugh
zì-zɔ̀n	< zɔ̀n	walk
kpí-kpábá	< kpábá	flatten
ɖì-ɖà	< ɖà	prepare
wì-wlán	< wlán	write

Fon (Akoha 2010: 70)

sí-sá	< sá	crawl
jī-jì	< jì	go
wì-wǎ	< wǎ	come

b. C*u* stems in Phla-Pherá and other Fon lects (Lefebvre & Brousseau 2002: 197)

ɖù-ɖù	< ɖù	eat

c. Stems with rounded vowels in Abomey lect (Akoha 2010: 66ff.)

ɖù-ɖù	< ɖù	eat
kú-kó	< kó	laugh
zù-zɔ̀n	< zɔ̀n	walk

ANALYSIS

There are 07 underlying vowels in Fon (cf. Lefebvre 2002: 15), which traditionally can be divided in two sets of vowels contrastively distinguished on the basis of their height, and degree of roundedness (104).

[39] Reduplication in Fon has benefitted from several studies among which Akoha 2010; Lefebvre & Brousseau 2002; Fabb 1992; Brousseau 1991, 1993 and Brousseau, Filipovich & Lefebvre 1989 just to name the few.

(104)

[-round]	[+round]	
i	u	[+ high]
e	o	[-high]
ɛ	ɔ	
a		

As observed in (103), the VRED is essentially conditioned by the V_1STEM. The RED is made up of the verbal stem-initial consonant followed by the front high unrounded vowel [*i*] (103a) (Lefebvre & Brousseau 2002: 197ff.). In certain Gbe lects, the VRED alternates between [*i*] and [*u*] (Lefebvre & Brousseau 2002: 202). In Phla-Pherá and in most Fon lects, [*i*] becomes [*u*] if only the V_1STEM is [*u*] (103b). By contrast, in the Abomey lect (Akoha 2010: 66ff.), any round vowel in the stem triggers roundedness of the VRED (103c). From the ongoing argumentation, it appears that Fon of Abomey, where the presence of any round vowel within the stem changes the VRED to [*u*], is CIR Type $IIIc_{(i)}$, while the other Fon lects, Phla-Pherá and Phla-Pherá-like are sub-categorized CIR Type IIa, as Yoruba, as only the presence of the the high, rounded, back vowel [*u*] within a stem triggers roundedness. See (105) for rule formalization.

(105)

i[+high, -round] → u[+round] / { __ CV[+round, +high] (103b); __ CV[+round] (103c) }

i[+high, -round] → i[+high, -round] / elsewhere (103a)

The RED always bears a L if the C_1STEM is a voiced consonant, regardless of the base tone (103a) (Lefebvre & Brousseau 2002: 195). In Abomey lect however, the RED tone is similar to that of the stem if the latter bears a H; it is M if the stem is L, and L if the V_1STEM bears a LH (103a) Akoha (2010: 67).

In Abomey lect, disyllabic stems offer two alternatives when the V_1STEM is equal to the V_2STEM. The stem can either be totally reduplicated accompanied by some tonal changes in certain cases (106a) or it can undergo CIR (106b). If the V_1STEM is different from the V_2STEM, total reduplication is compulsory (106c) (Akoha 2010: 67f.). Fully reduplicated forms are the most used.

(106) Fon (Akoha 2010: 67f.): Action/stative nouns

	RedF (Full RED)	Gloss	Verb	Gloss
a.	kóló-kóló	being fat	< kóló	be fat
	kpélé-kpélé	being gathered	< kpélé	gather
	bàlà-bàlà	being fastened	< bàlă	fasten
	ʤɔ̀lɔ̀-ʤɔ́lɔ́	being straightened	< ʤɔ̀lɔ̃	straighten
	fɛ́lɛ́-fɛ́lɛ́	being withdrawn	< fɛ́lɛ́	withdraw
	RedF (CIR)	Gloss	Verb	Gloss
b.	kú-kóló	being fat	< kóló	be fat
	kpí-kpélé	being gathered	< kpélé	gather
	bì-bálá	being fastened	< bàlă	fasten
	ʤù-ʤɔ́lɔ́	being straightened	< ʤɔ̀lɔ̃	straighten
	fí-fɛ́lɛ́	being with drawn	< fɛ́lɛ́	withdraw
c.	kíʤé-kíʤé	searching	< kíʤé	search
	fúɖá-fúɖá	being lightweight	< fúɖá	be lightweight

CI-reduplication is very productive in Fon. It is used in deriving action and stative nouns (cf. 103-106) (Lefebvre & Brousseau 2002: 195ff.), and to intensify verbs in the Abomey lect (107) (Akoha 2010: 70). The context however is very determining in apprehending the exact meaning of reduplicatives (Akoha 2010: 69 and Fabb 1992: 3).

(107) Fon (Akoha 2010: 70): Verb intensification

RedF	Verb	Gloss
*gbì-*gbɔ̃	< gbɔ̃	suck
tű-tű	< tű	loosen up
fű-fű	< fű	strew
vù̃-vű	< vu̇̃	shred

(108) Derivation

Underlying Form		CIR rule	Rule in (105)	
/xɔ̀/	'buy'	xI-xɔ̀	xI-xɔ̀	(103a)
/kpábá/	'flatten'	kpI-kpábá	kpI-kpábá	
/ɖù/	'eat'	ɖI-ɖù	ɖI-ɖù	(103b)
/kó/	'laugh'	kI-kó	kI-kó	(103c)

3.3.7. Kru: Krumen

Consider the following data.

(110) Krumen (Marchese 1979: 101f.): Action nouns

a. Stems with high vowels

RedF	Verb	Gloss
di̱-di̱-e̱	< di̱	eat
ti̱-ɪ̄ī-ɛ̄	< tī	descend
du̱-du̱-e̱	< du̱	pound
ku̱-ku̱-ē	< ku̱	push
kʊ̱-kʊ́-ɛ́	< kʊ́	die

b. Stem with labial onsets

gbʊ́-gblá	< gblá	sew
wu̱-we̱	< we̱	cry
wʊ̃wɔ̀˜	< wɔ̀˜	fight

c. Elsewhere

kí-kle̱	< kle̱	catch
lí-lá	< lá	kill

ANALYSIS

There are nine underlying vowels in Krumen (cf. Marchese 1979 et Dawson 1975) which can be described contrastively on the basis of their place of articulation, height, and tenseness (111).

(111)

[-back]	[+back]			
i	u	[+ATR]	[+high]	
ɪ	ʊ	[-ATR]		
e	o	[+ATR]	[-high]	
ɛ	ɔ	[-ATR]		
a				[+Low]

From a formal perspective, CI-reduplication in Krumen is of the CIR Type $IIIa_{(i)}$ as it appears clearly from the data in (110) that height assimilation is the major factor that conditions the VRED allomorphy.

The RED in Krumen comprises a copy of the C_1STEM followed by a high vowel that agrees in backness and roundedness with the V_1STEM (Marchese 1979: 100f.). There is complete identity between the RED and the stem-initial CV if the V_1STEM is high (110a). If the V_1STEM is non-high, the RED is C*i*- (110c). If the C_1STEM is a labio-velar glide or consonant, the RED changes to C*u*-/C*ʊ*- (110b). See (112) for rule formalization.

(112)

i[+high, -back] →
- ɪ[αback, αATR] / __CV[αback, +high, αATR] (110a)
- u/ʊ[+back, αATR] / __C[+lab]V[-high, αATR] (110b)
- i[αfeatures]/ elsewhere (110c)

(113) Derivation

Underlying Form		CIR rule	Rule in (112)	
/*di*/	'eat'	di-*di*	di-*di*	(110a)
/kʊ́/	'die'	ki-kʊ́	kʊ́-kʊ́	
/gblá/	'sew'	gbi-gblá	gbʊ́-gblá	(110b)
/lá/	'kil'	li-lá	lí-lá	(110c)

C*l*V clusters reduplicate as C (110b/c). Stems ending in a high vowel take the suffix –E which harmonizes in [ATR] with their nucleus (110a). CI-reduplication is used in Krumen to derive action action nouns (cf. 110).

3.3.8. Gur: Kulango, Bouna

Consider the following data comparing alongside the VRED quality with that of the V_1STEM.

(114) Kulango (Bogny 2005:15f.): Function omitted in the source

a. Stems with unrounded vowels

RedF	Verb	Gloss
tɪ̃-tɛ̀	< tɛ́	broke (smt)
ʃɪ̃-ʃā	< ʃā	smatch/grind
dɪ̃-dī	< dī	**eat/graze**

a. Stems with unrounded vowels

dʊ̃-dò	< dō	filter
fʊ̃-fɔ̀	< fɔ̀	roast
ɓʊ̃-ɓlú	< ɓlú	share/divide

ANALYSIS

There are eight vowels identified in the Kulango data in (114). These vowels can be distinctively defined on the basis of their roundedness, height, and tenseness as illustrated in (115).

(115)

[-round]	[+round]		
i	u	[+ATR]	[+high]
ɪ	ʊ	[-ATR]	
	o	[+ATR]	[-high]
ɛ	ɔ	[-ATR]	
a			

CI-reduplication in Kulango is of the Type $IIIc_{(i)}$ pattern as it displays similarly as in Anyin and Abidji, i.e. the presence of any round vowel within the stem assimilates the VRED in roundedness (cf. (114b)). However, the VRED in Kulango is always a high, -ATR, nasalized vowel which agrees in backness with the V_1STEM as formalized in (116). The RED is C*ĩ*- for roots with unrounded vowels, and C*ʊ̃*- for roots with rounded vowels. The RED bears a mid tone except from the bolded exemple in (114a) with a L.

(116)

Ĩ[+high, -ATR, +nas] → *ĩ*[-back] / __CV[-round] (114a)

Ĩ[+high, -ATR, +nas] → ʊ̃[+back] / __CV[+round] (114b)

(117) Derivation

Underlying Form		CIR rule	Rule in (116)	
/tɛ́˜/	'broke smt.'	t*ĩ*-tɛ́˜	t*ĩ*-tɛ́˜	(114a)
/dī/	'eat/graze'	d*ĩ*-dī	d*ĩ*-dī	
/fɔ̀/	'roast'	f*ĩ*-fɔ̀	f*ĩ*-fɔ̀	(114b)
/ɓlú/	'share'	ɓ*ĩ*-ɓlú	ɓ*ĩ*-ɓlú	

3.4. Conclusion

This chapter discussed synchronic characteristics – in each of the sample languages – about CI-reduplication that uphold cross-linguistic generalizations outlined in the preceding chapter. Two major aspects were envisaged for each case study: a corpus, and an analysis including a brief account of the target language phonemic vowel system, its sub-categorization to one of the three CIR formal patterns coupled with assimilation rules determining the RED allomorphy, the semantic role(s) fulfilled by CIR, and a simplified sample derivation aiming at rendering explicit the application of the assimilatory rules.

From a formal perspective, it was possible to assign each studied language to one of the three formal patterns identified in Chapter 2, namely, (i) CIR Type I for languages with an invariable RED, (ii) CIR Type II for those with a quasi-invariable RED, and (iii) CIR Type III for languages with a variable RED exception made from two languages, Zhoa, and Mwaghavul, which were not classified due to insufficient data. In the CIR Types II and III languages, the RED allomorphy is context sensitive. The major difference between Type II and Type III languages lies on the fact that in the latter, the RED is always identical to the stem initial-CV for stems with high vowels whereas in the former pattern, the RED comprises a default high vowel, quasi fixed, which assimilates roundedness solely in the presence of the high, back, rounded vowel [u] within a given stem, preceded in certain cases by a very restricted sub-class of labial consonants (cf. Yoruba, Fon (Abomey lect excluded), Oko and Hyam of Nok). In Yoruba for example, the assimilatory process is free while in Oko, the vowel [*u*] must be preceded by the labio-dental, voiceless fricative [*f*].

The mechanism governing the RED allomorphy primarily depends on phonotactic constraints related to language vowel systems, and secondly on the nature of segments or combination of segments effecting the VRED in certain Types II and III languages. Across languages, three primary triggering factors govern the RED allomorphy: (i) height assimilation, (ii) roundedness assimilation, and (iii) place assimilation. That high and rounded vowels have precedence over non-high and unrounded ones respectively; that labial and palatal consonants in some languages modify the VRED only in situations where the stems comprise non-high vowels; that labio-velarized onsets also assimilate the VRED in roundedness, while it is not always the case with palatalized onsets (cf. Ningye), certainly suggests a possible hierarchy among segments determining the RED exact shape. Table 3 presents a general overview of the hierarchy of CIR triggering and conditioning factors.

Table 3: Hierarchy of triggering and conditioning factors in the domain of CIR

(1)	V_1:	(a)	assimilator,		
		(b)	conditions assimilation		
(2)	C_1	(a)	secondary modifications:	Cw before Cj	
		(b)	primary quality:	(i) approximants:	w before j
				(ii) grave consonants:	labials only; both labials and velars
				(iii) non-grave consonants:	aveolars only; only palatals; both alveolars and palatals.

A generalization regarding roots undergoing CI-reduplication it that they are mostly monosyllabic, cf. Ron, Igbo, Yoruba, Emai, Arigidi, Nupe, Ningye, Fyam, Tarok, Kutep, Vengo, Fe'fe', Anyin, Attié, Krumen, and Kulango. Disyllabic stems reduplicate also as in Oko, Ninzo, Hyam, Obolo, Isu, Bafut, Abidji, Fon, and Akan. In Fon, disyllabic stems reduplicate totally if the V_1 # V_2 while disyllabic stems where the V_1 = V_2 either reduplicate totally or via CIR. Makaa is the only language so far where any given stem can undergo CI-reduplication, irrespective of its length.

CHAPTER 4: THE IMPLICATION OF TYPOLOGY TO A GENERALIZED APPROACH OF CIR

4.1 Introduction

This chapter provides the reader with a clear and concise picture of the goal intended within this dissertation, how it was handled and the results obtained. Section 4.2 summarizes the major claims and presents the implications of a typological analysis to a better understanding of CI-reduplication cross-linguistically. Section 4.3 states the merit of the present research to previous accounts of CI-reduplication taking Yoruba as a case study. Section 4.4 provides an alternative account of CI-reduplication in Yoruba based on slighty modified versions of Marantz's 1982 and Pulleyblank's 1988 approaches.

4.2 Major findings

This section summarizes the major claims made within this study in reponse to the research questions in section 0.1.

4.2.1 How much is copied, and where are the copied segment(s) fitted in?

It has been argued in this study, in accordance with Marantz's 1982 (cf. 4.3.1), that CI-reduplication is a clear case of affixation (prefixation) at the exception that the RED segmental material originates from the base to which it attaches. The RED is CI- in shape (cf. 2.7.1.2), and consists generally of a copy of the C_1STEM followed by a high vowel. However, in Ondo Yoruba and Emai (cf. 3.3.1.1) – languages whose phonology treats CV and V syllables the same – the RED of onsetless stems has no initial consonant. Complex onsets are banned in the RED; reduplicated digraphs are considered as single phonemes. The RED is unvariably short irrespective of the weight of the stem-initial syllable.

As for the tonology of the RED cross-linguistically, three distinct patterns were found (cf. 2.7.1.9).

- Languages where the stem lexical tone is transferred to the RED (Hyam, Igbo, Tarok and Kutep).

- Languages where the RED acquires its tone with respect to the context (Tarok, Vengo, Fon (Abomey), Makaa and Attié).
- Languages where the RED has a fixed tone:
  - H(igh): Yoruba, Emai, Makaa, Fyam and Nupe,
  - M(id): Kulango, Nupe,
  - L(ow): Anyin, Akan, Tarok, and Fon (except Abomey lect),
  - $^{\downarrow}$H(igh): Isu.

4.2.2 Which forms do CIR take cross-linguistically?

From a formal perspective, three distinct patterns were identified (cf. 2.7.1): (a) CIR Type I with a fixed RED, (b) CIR Type II with a quasi-fixed RED and (c) CIR Type III with a variable RED.

In CIR Type I languages, no change is observed in the RED as its vowels remains fixed, unaffected by neighbouring segments.

CIR Type II pattern constitutes an intermediate stage between CIR Types IIIc and I languages respectively. The high, back, rounded vowel [*u*] exclusively assimilates and conditions the VRED in CIR Type II languages.

In languages with variable RED, .i.e CIR Type III languages, allomorphy is primarily determined by three features depending on the sub-pattern, i.e. height for CIR Type IIIa, place of articulation for CIR Type IIIb, and roundedness for CIR Type IIIc. In Type IIIa languages, the presence of a high vowel within a stem always implies complete identity between the RED and the stem-initial CV. On the other hand, if the stem comprises a non-high vowel, the RED is context sensitive; and the allomorphy is triggered either by the quality of the V_1STEM, the C_1STEM or by both simultaneously (cf. 2.7.1.2 and 2.7.1.3). In CIR Type IIIb languages, the RED high vowel harmonizes in [αPlace] with the V_1STEM. In CIR Type IIIc languages, the presence of any round vowel within a given stem constrains the VRED to assimilate roundedness.

Two languages – Mwaghavul and Zhoa – were not classified because of lack of sufficient data (Mwaghavul and Zhoa).

4.2.3 Which function(s) does/do CIR fulfil?

Within the 27 Niger-Congo and 2 West Chadic languages used for this study, CI-reduplication is productively and unproductively used to mark functions with (cf. 2.7.2.1) or without (cf. 2.7.2.2) iconic motivation, similar in essence to the way Indo-European languages like French, English, German or Austronesian languages like Bikol, Samoan, Sundanese use affixation, total or partial reduplication to mark word derivation and inflection (Moravcsik 1978, Mattes 2007). CI-reduplication functions with iconic motivation[40] include:

- Increased quantity
    - Duration (cf. Emai, Vengo, Daffo [Ron], Hyam of Kwoi, and Fe'fe')
    - Plurality (cf. Akan, Obolo, Mwaghavul, Ron, Ninzo, Ningye, Hyam of Kwoi, Arigidi, and Fyam)
- Increased quality
    - Verb intensification (cf. Vengo, Fon, Abidji, Beezen and Tarok)
    - Adjective intensification (cf. Tarok and Isu)
- Decreased quality
    - Diminution (cf. Makaa, Tarok and Fe'fe')

The CI-reduplication function with non-iconic motivation exclusively serves word formation. A considerable amount of lexical items are no more related synchronically to existing lexemes.

- Action and stative nouns (cf. Oko, Yoruba, Fon (Abomey lect excluded), Nupe, Krumen, Kutep and Igbo)
- Nouns referring to people/object/thing (cf. Bafut, zhoa, Isu, Hyam of Nok, Ninzo, Obolo, Makaa, Kutep, Ron, Igbo and Fe'fe')
- Nouns and adverbs from a female's stylish language (cf. Tarok)
- Verbs (cf. Hyam of Nok, Akan, Ron Obolo, Makaa)
- Verbal adjectives describing state, odours and taste (cf. Makaa, Tarok and Fon)
- Adverbs (cf. Makaa, Ninzo, and Zhoa)
- Reflexive pronouns (cf. Tarok)

Across languages, it was observed that CI-reduplication targets four major grammatical categories, namely, verbs, adjectives, pronouns and nouns (cf. 2.7.2.1 and 2.7.2.2).

[40]cf. 2.7.3, Table 2.4 for a detailed overview

4.2.4 Is CIR Yes/No a truncated version of full reduplication?

Another interesting debate with regard to CI-reduplication is if Yes/No it originates from the erosion of a totally reduplicated stem, or if it has developed separately from the affixation of a primary CV- or CI- RED as currently displayed in the West Chadic and Niger-Congo languages.

4.2.4.1 CIR as a result of syllabic reduction

As a first stab at the question regarding the probable historical development of CI-reduplication, Faraclas & Williamson (1984: 2f.), referring to Hyman's 1972, Robinson's 1976 and Sibomana's 1980 analyses of CIR in Fe'fe', Akan and Tarok respectively – languages where only monosyllabic stems undergo CI-reduplication – "conclude that originally reduplication was complete in all cases, and that reduction has taken place first in monosyllabic stems". The same observation holds for Igbo (3.3.1.2). It is observed in the data that total reduplication and CIR coexist in Tarok (3.3.2.5) and Fon (Abomey lect) (cf. 3.3.6.4), and both forms mark the same grammatical function. The finding of the synchronic co-existence of full reduplication and CIR in Fon of Abomey and Tarok thus suggests a transitional stage between the two stages, evidence for the reduction hypothesis sustained by Faraclas & Williamson 1984.

4.2.4.2 CIR as a result of dissimilation

An alternative analysis to the 'reduction hypothesis' will be to postulate à la Yip 1998, based on the synchronic coexistence of total reduplication and CI-reduplication in Tarok and Fon still, that CIR owes its origin to phonological processes such as dissimilation rather than truncation. Synchronically, there is no clear evidence that CIR in Tarok and Fon of Abomey originates in totally reduplicated forms as it is triggered by dissimilation in disyllabic stems in Fon of Abomey. If a disyllabic stems comprises two similar vowels, i.e. $V_1 = V_2$, it either reduplicates totally (1a) or it undergoes CIR (1b). On the other hand, if the stem vowels are distinct (1c), i.e. $V_1 \neq V_2$, CIR is forbidden and total reduplication is the only acceptable option.

(1) Fon: Akoha (2010: 67f.): Action/stative nouns

	RedF (Full RED)	Gloss	Verb	Gloss
a.	kóló-kóló	being fat	< kóló	be fat
	bàlà-bàlà	being fastened	< bàlă	fasten
	RedF (CIR)	Gloss	Verb	Gloss
b.	ʤù-ʤɔ́lɔ́	being straightened	< ʤɔ̀lɔ̌	straighten
	fí-fɛ́lɛ́	being withdrawn	< fɛ́lɛ́	withdraw
	RedF (Full RED)	Gloss	Verb	Gloss
c.	kídʒé-kídʒé	searching	< kídʒé	search
	fúɖá-fúɖá	being lightweight	< fúɖá	be lightweight

Similar cases are reported in the literature. Many languages are renowned for having a phonological process, a morphological or morphosyntactic rules avoiding sequences of homophonous elements, be it tones, phonemes or morphemes (cf. Leben 1973, McCarthy 1986, Kenstowicz 1994, Yip 1988, 1998). This principle is generally referred to as the obligatory contour principle (OCP). In Javanese for example, "echo-words result from the tension between a requirement that penalizes a sequence of two identical stems, OCP (Stem), and one that requires two identical stems, REPEAT (Stem)" (Yip (1998: 1).

In the same light, the mechanism via which segments are borrowed and transferred from parent materials to the REDs provides another evidence that CI-reduplication may be treated independently. In general, in the formalization of reduplication, there are two possible mechanisms through which the RED acquires materials from the root, by copying or by spreading (Wiltshire & Marantz 2000: 563).

4.2.4.3 The full copy model

Center to the full copy model is that reduplication always begins with a complete copy of the base (or just the segments of the base in some cases) followed by the insertion of fixed segments (Steriade 1988: 73, McCarthy 1981: 412f.). Once the copied elements associate to the available timing slots in the RED, non-associated segments are stray erased (cf. (3)).

Consider examples in (2) from Isu. Recall that the RED is C*i*- for stems with unrounded vowels (2a), and C*u*- for stems with rounded vowels, or biphonemic labio-velarized onsets (2b).

(2) Isu (Kießling 2012: 10f.): Intensive verbal adjectives/ Frozen nouns

a. Stems with unrounded vowels

RedF	IPF verbal form	Gloss	Source	Gloss
dɨ̂-díjɛ̀	-	be huge	< dìjɛ̀	huge
tɨ̂-ɪɛ́bə́	tɛ́bə́	be small	< tɛ́b	small
ɣɨ̂-ɣáʔá	ɣáʔá	be fat	< ɣáʔ	fat

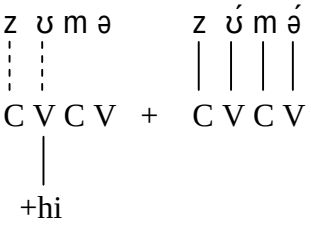
b. Stems with rounded vowels or biphonemic labio-velarized onsets

bû-buí	-	be soft	< búi	soft
zʊ̂-zʊ́mə́	zʊ́mə́	be dry	< zʊ́m	dry
kə́-bú-bwái	water snake		?? bwai	
kə́-sú-sɔ́ʔɔ́	termite		?? sɔʔɔ	

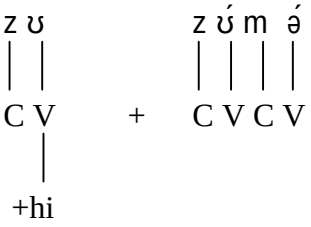
Following Faraclas & Williamson's claim that CIR develops from total reduplication, zʊ̂-zʊ́mə́ 'be dry' is derived as in (3).

(3) Stem

Total reduplication + stem



Truncation + stray erasure

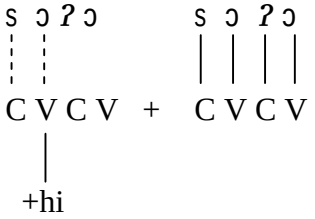


CIR

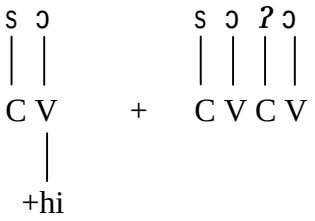
Though Faraclas & Williamson's 1984 proposal is successful in deriving cases where the RED is identical to the stem-initial CV, yet, it fails to predict forms in (2a/b), where the VRED differs from the V_1STEM. The same derivation in (3) applied to -sú-sɔ́ʔɔ́ yields *-sɔsɔʔɔ, and it fails to predict how the RED results into C*u*-, knowing that Isu counts two back unrounded vowels [ʊ] and [*u*], and that the RED and the stem agrees in tenseness only if the V_1STEM is high (cf. 3.3.5.2).

(4) Stem

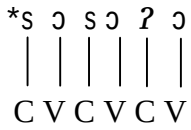
Total reduplication + stem



Truncation + stray erasure



CIR



The hypothesis according to which CI-reduplication originates from the truncation of a prior fully reduplicated form seems not very strong with regard to (4). Some questions still remain unanswered. If historically, CIR develops from full reduplication:

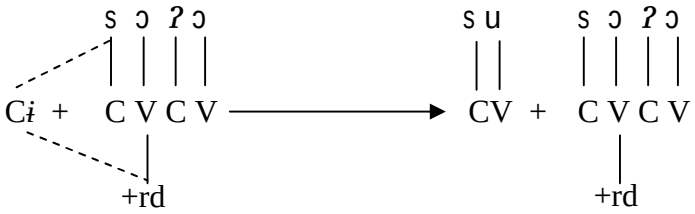
- Why is the stem tonal melody not copied? How does the RED acquires its HL?
- How does the C*i*- RED acquire labiality for the forms in (2b), where a feature is copied rather than the entire V_1STEM?

4.2.4.4 The spreading model

The spreading approach formalizes reduplication within the principles of autosegmental phonology. The core idea of autosegmental phonology, as articulated by Goldsmith 1976a, 1976b, is that the elements that constitute the phonological word – tones, segments, and features – are separated, i.e. represented on different tiers, but coordinated by association lines (McCarthy 2011: 1). Center to autosegmental reduplication is that reduplication begins with the prefixation of a RED to a given stem followed by the spreading of borrowed elements – represented by linking lines – from parent materials to REDs. (5) provides a simplified derivation of CI-reduplication via spreading in Isu. It is seen that, if the C*i*- prefix is added to the stem, it triggers the spreading of the C_1STEM and the [+rd] feature of the V_1STEM. They borrowed elements link to the RED onset and the VRED respectively. The VRED becomes [*u*] after labial assimilation.

(5) Stem

RED + stem



PR [susɔʔɔ]

The derivation in (5) gives more credit to the spreading approach which accounts more accurately for CI-reduplication than the full copy model which presents some shortcomings.

4.2.4.5 Palatal infixation in Isu: A further note on CI formal development

Synchronically, a case of CI- reduction to a palatal infix marking causative and pluractional was identified, a strong evidence in favour of the reduction hypothesis by Faraclas & Williamson 1984 which also entails a loss of the reduplicate C. Kießling (2012: 13) describes a very interesting case of a palatal infixation in Isu which might result from the obliteration of a prior *C*i*- reduplication prefix marking progressive. The infix has the form -*i*- (6b); it occurs

immediately after the initial consonant of the verbal root, and it is used to mark causative, pluractional and imperfective.

(6) Isu (Kießling 2012: 10f.)

a. CI-reduplication: Intensive verbal adjectives

RedF	IPF verbal form	Gloss	Source	Gloss
dɨ̂-díjɛ̀	-	be huge	< dìjɛ̀	huge
lɨ̂-lə́ŋə́	lə́ŋə́	be red	< lə́ŋ	red
bɨ̂-bɛ́bə́	bɛ́bə́	be bad	< bɛ́b	bad

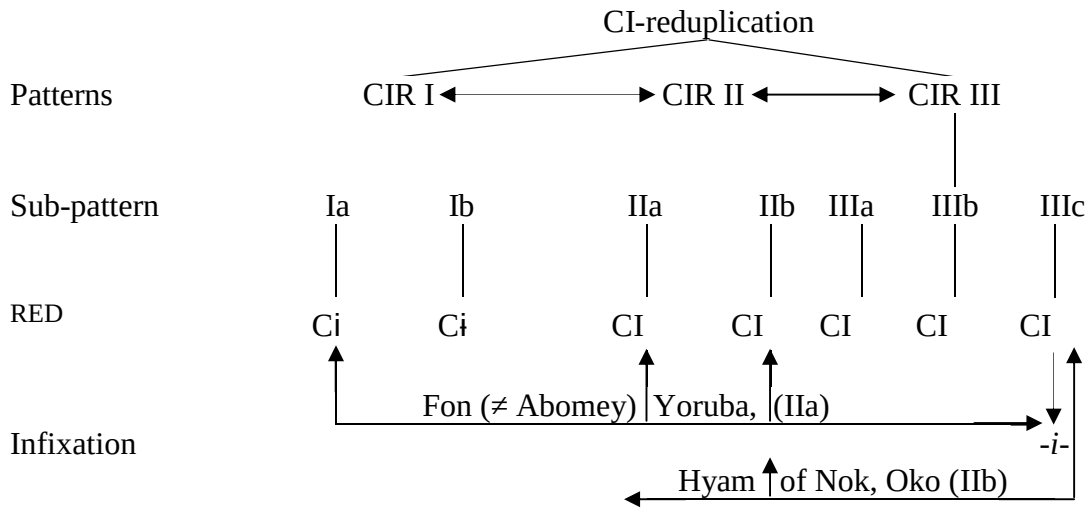
b. Infixation

Causative PERF	Causative IMPF	Gloss	Source	Gloss
b-i-àŋì	b-i-àŋə̀	redden	< bàŋ	be red
d-i-àbì	d-i-àbə̀	lengthen	< dàb	be long
b-i-ɛ́bí	b-i-ɛ́bə́	spoil	< bɛ́b	be bad

PLUR PERF	PLUR IMPF	Gloss	Source	Gloss
t-i-áŋí	t-i-áŋə́	count several times	< táŋ	count
k-i-ɛ́mí	k-i-ɛ́mə́	break in several parts	< kɛ́m	break
b-i-ɔ́ŋí	b-i-ɔ́ŋə́	pick up repeatedly	< bɔ́ŋ	pick up

The probable reduction of the CI- RED to an infix has two majors implications. First, it confirms the fact that languages change with time. Second, it suggests that languages with CIR might not simply mutate from CIR Type III to CIR Type I or the other way round, but it also suggests that any of the previously mentioned formal types may likely undergo an obliteration of the onset and reduce to an infix as illustrated in (7).

(7)



Though it is was previously stated that CIR Type II constitutes an intermediate stage (cf, 2.5.1 and 4.1.2) between CIR Type III and CIR Type I languages, the three formal patterns are considered independent and ranged on the same tier. Left and right arrows are used to express the probable double-way change that may occur within natural languages. A downward arrow is used to mark the precedence of the intermediate category (CIR Type II) over the infix *-i-*. Upward arrows indicate probable intertype transitions attested in the data – Yoruba, Fon (Abomey), CIR Type IIa; and Oko, and Hyam of Nok, CIR Type IIb) – depending on the probable cline path of change. Two possibilities are observed in (7):

- CIR Type I a → CIR Type IIa or b → CIR Type IIIc (from fixed to variable RED)
- CIR Type IIIc → CIR Type IIa or b → CIR Type I (from variable RED to fixed RED)

Yoruba, a CIR Type IIa language, for example may be hypothesized to be a CIR Type Ia language undergoing a change towards CIR Type IIIc, or the other way round, i.e from CIR Type IIIc to CIR Type Ia. Remember that in Yoruba (cf. 3.3.1.1), if the V_1STEM is [u], the RED is either C*i*- or C*u*-. The C*i*- form is the preferred and currently used form. The C*u*- is being abandoned and less mentioned in scientific works. Based on remnant traces observed, it can be also hypothesized that Hyam of Nok, a present CIR Type IIb, is probably a prior CIR Type IIIc language undergoing changes towards CIR Type I.

From a glance at the representation in (7), it may seems that the link between the *-i-* infix and the Isu default C*i*- prefixed RED (cf. 3.3.5.2) is not transparent enough knowing that for stems comprising the high front unrounded vowel [*i*] the RED is C*i*- rather than C*i*-. A related question could also be for one to wonder under which circumstances [*ɨ*] turned to [*i*] diachronically. The synchronic studies in chapter 3 provide supportive evidence to the representation in (7) and to Kießling's (2012: 13) hypothesis on the probable origine of the palatal infix in Isu marking causative, and pluractional. First, the fact that the forms in (6) probably originates from a CI-reduplicated form suggest that prior, CIR in Isu might have been of the CIR Type IIIa, the category of languages within which the RED is identical to the stem-initial CV if the VSTEM is high. An alternative analysis could be that, prior, Isu was of the Type IIIb pattern, the type of language where the RED is C*i*- for stems with front vowels, C*i*- for stems with central vowels, and C*u*- for stems with back vowels, with the VRED agreing in tenseness with the V_1STEM where possible. Causative marking likely took place at this same period as a language-internal development.

4.2.5 Synchrony explained by diachrony

At first sight, the fact that CI-reduplication is restricted to the Central/West Africa area with a hot-bed in Nigeria/Cameroon, and spreads over two major African language phyla (Niger-Congo and Afro-asiatic) might reflect probable historical language contact. Where are the contact zones located (if any)? Which languages are in contact? Which features are shared among Niger-Congo languages? Among Niger-Congo languages and the two West Chadic languages? How are specific and shared features of CIR acquired? The preceding questions are at the center of the debate in the present section.

4.2.5.1 Which languages are in contact? Where ?

It was earlier mentioned in this study (cf. 2.7.4) that CI-reduplication is a morphophonological process found in 29 language units widespread over 6 West/Central African countries, namely, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria and Cameroon. Four major clusters of languages where identified.

- 3 Kwa languages, Anyin, Attié and Abidji in the East of Côte d'Ivoire. These languages are geographically distant from Akan and Fon (two other Kwa languages isolated in Ghana and Benin/Togo respectively), and from Krumen (Kru) and Kulango (Gur).

- 6 West Benue-Congo languages, Yoruba, Emai, Arigidi, Oko and Igbo in Southern Nigeria. These languages are geographically distant from the aforementioned Kwa, Gur and Kru languages spoken in Côte d'Ivoire, Ghana, Togo and Benin; from Plateau languages and Obolo (Cross River) spoken in Nigeria; and finally from Kutep, a Jukunoid language spoken across boundry in Western Cameroon.

- A cluster of 7 languages made up of 2 West Chadic languages, Ron and Mwaghavul surrounded by 5 Plateau languages, Hyam (of Nok and Kwoi), Ninzo, Ningye, Fyam and Tarok.

- A cluster of 6 languages comprising Beezen (Jukunoid), Vengo, Isu and Zhoa (Bantoid, Ring), Bafut (Bantoid, Ngemba), and Fe'fe' (Bantoid, Bamileke). These languages are geographically very distant from Makaa (Bantoid, Narrow Bantu) spoken in Eastern Cameroon.

Synchronically, two major zones – from the preceding geographical distribution of language clusters – constitute a language contact area among languages from different language branches.

- The Plateau State in Nigeria for the contact between Plateau languages and the West Chadic languages.
- Western Cameroon for the contact between the Jukunoid and Bantoid language branches of Niger-Congo.

4.2.5.2 Features shared among Languages

A cross-linguistic generalization from Tables 2.4 and 2.5 is that CI-reduplication is mostly widespread in Niger-Congo than in West Chadic.

From a formal perspective, CIR Type III is the more widespread pattern across languages, and the sub-pattern CIR Type IIIc is the form shared between a Plateau language, namely Ningye and the West Chadic language Ron (cf. 3.2).

From a functional perspective, lexicalization is so far the most predominant function assumed by CIR cross-linguistically (cf. 2.7.3). 4 function of CI-reduplication including lexicalization are dominant in certain language branches (8a) or shared among non-related languages (8b). For the latter case, some functions spread over few non-related languages (pluractional, progressive, general plural marking, verb intensification, and verbal adjectives describing taste, odours or a state) and others (action/stative nouns and lexicalization) over several languages.

(8) a. Dominant functions in certain language branches

Function	Language branch
Verb intensification	Kwa
Action/Stative noun	West Benue-Congo
Plurality (ADJ, ADV, verb, noun)	Plateau
Lexicalization	Plateau and Bantoid

b. Functions spreading over few non-related languages

Function	Language branch/Language
Pluractional	Akan (Kwa)/Mwaghavul (Plateau)
Progressive	Vengo (Bantoid)/Daffo(West Chadic)

Verbal ADJ describing odours/taste/state	Tarok (Plateau)/Fon (Kwa)/ Makaa (Bantoid)
Verb intensification	Vengo (Bantoid)/Fon (Kwa)/ Obolo (Cross River)/Tarok (Plateau)
General plural	Ron (West Chadic)/Fyam, Ningye, Ninzo (Plateau)

c. Functions widespread cross-linguistically

Action/Stative noun	Yoruba, Nupe, Igbo, Oko (WBC) Fon (Kwa), Kutep (Jukunoid), Krumen (Kru)
Lexicalization	Makaa, Bafut, Zhoa, Isu, Fe'fe' (Bantoid); Kutep (Jukunoid); Igbo (West Benue-Congo; Hyam of Nok (Plateau); Ron (West Chadic)

It is observed in (8) that CI-reduplication marks pluractional in Mwaghavul (West Chadic, spoken in Plateau State, Nigeria) as well as in Akan (Kwa), a non-related and distant language spoken in Ghana. CIR is used in Ron to mark general plural as in the Plateau languages Fyam, Ningye and Tarok. Many lexical items in Ron languages as in several Niger-Congo languages present remnant traces of a prior derivation via CIR.

4.2.5.3 How are CI-reduplication features acquired?

Basically, there are four reasons that can help explain cross-linguistic similarities among languages, (a) shared inheritance, (b) language contact, (c) shared environmental conditions, and (d) reference to language types (Moravcsik 2013: 8). Whatever the exact formal development of CI-reduplication is, definitely, there is no obvious way its origin could be related to (c), environmental or socio-linguistic variables. After discarding (c), it remains to prove if Yes/No the similarities observed among Niger-Congo languages on the one hand, and Niger-Congo and the West Chadic languages on the other hand are due to (a), (b) or (d).

Diachronically, no research has attempted a study of CI-reduplication in Niger-Congo or in the West Chadic branch of the Afroasiatic phylum. However, CIR is alluded to in Jungraithmayr 1970 but not in Wolff & Gerhardt 1977, Gerhardt 2014 and Wolff 1984, 2008. On the contrary, in Niger-Congo, a proliferation of synchronic studies on CI-reduplication

emerged since the pioneering work by Schachter & Fromkin 1968 dealing with reduplication in Akan.

Gerhardt (2014:1), working on verbal pluralization strategies in Plateau languages, argues that similarities observed between this branch of languages and adjacent Chadic languages in marking pluractional are due to internal developments rather than to language contact. From a formal perspective, pluractional markers in Plateau are similar to the well-known set of verbal extensions in Niger-Congo (**s, *n, *k* and **d*) with different functions however (Gerhardt 2014: 1 referring to Mukarovsky 1963: 80ff.).

The publication by Wolff 2008 on the reconstruction of formatives marking plurality in Chadic seems to sustain the idea according to which CI-reduplication at the origin was not a common feature for Chadic languages in general. Historically, pluractional in Chadic (West, Central and East) was marked by prefixal reduplication (CV-, C-), *-*a*- infixation and suffixal reduplication (-CV). Some languages combine prefixal or suffixal reduplication with *-*a*- infixation in marking pluractional (Wolff 2008: 10f.). For noun plurality, Wolff (2008: 12ff.) reconstructs prefixal reduplication (CV, C) and –*a*(*a*)- infixation in West, Central and East Chadic; and several frozen suffixal determiners: *-W, (also in combination with internal *a*, and reduplication) in West and East Chadic; *-*n*, *-*k* and *-Y (always with -*i*, also with internal -*a*-, and reduplication) in West, Central, East Chadic and Masa; and *-*d* (always with final -*i*, also with internal -*a*-) in West and Central Chadic.

From the preceding arguments, one can conclude regarding CIR formal patterns that, the CI-formative attested in Ron and Mwaghavul (West Chadic) is quite new and different from the reconstructed formative forms in Chadic used in marking both general plural and pluractional. The CI- formative in Ron and Mwaghavul is quite similar in form and function to the well-known CI-reduplication widespread in Niger-Congo. Since the study by Wolff on the reconstruction of plurality formatives in Chadic does not mention CIR, it is likely that its presence in Ron and Mwaghavul is a consequence of these languages being in Contact with the Plateau languages Ninzo, Hyam, Fyam, Ningye and Tarok in the Plateau State in Nigeria.

However, similarities in form and function cannot simply be attributed to language contact taking into consideration that Mwaghavul shares the pluractional functional with Akan, a Kwa language spoken in Ghana. It seems that Mwaghavul owes pluractional via CIR from an internal development[41]. Similarly, in Niger-Congo, some CIR functions probably result from

[41]cf. 2.5.4 for detail on the other functions specific to single languages.

language-internal developments as they are found exclusively in single languages, e.g: distributive plural in Hyam of Kwoi, persistive in Emai, frequentative aspect in Arigidi, diminutives in Makaa just to name the few.

Ron has the same CIR formal pattern as Ningye, i.e CIR Type IIIc. From a functional perspective, Ron shares general plural marking and lexicalization with Ninzo, Ningye and Fyam (Plateau languages) and many other Niger-Congo languages (Makaa, Kutep, Igbo, Bafut, Zhoa, Isu, Hyam of Nok and Fe'fe'), cf. 2.7.4. Two possible facts can be given to account for the similarity obvserved between Ron and Niger-Congo languages.

- For the general plural marking, since plural marking is well known to be widespread in Chadic though marked by different formatives, my intuition is that Ron borrowed the CI- formative from Plateau languages to mark a function common in Chadic languages.

- For lexicalization, it is likely to be the result of an internal development. To conclude à la Gerhardt 2014, it seems lexicalization is part of the linguistic inventory of the Proto languages from which Niger-Congo and West Chadic languages sprung respectively. Each language thus have recourse to any formative of its choice to generate new lexical items.

In sum, similarities observed between the plateau languages of the Niger-Congo phylum and some adjacent West Chadic languages, namely, Ron and Mwaghavul, are not accidental but have to do with (a) shared inheritance and (b) language contact. Subsequently, it is not wrong to add CI-reduplication to the list of the five features shared by Chadic (West Chadic branch) and Niger-Congo languages assembled by Gerhardt & Wolff 1977 or to conclude following Gerhardt 2014 that similarities observed between plurality in Niger-Congo and adjacent Chadic languages are mostly due to internal developments rather than to language contact.

On the other hand, the widespread distribution of CI-reduplication over Niger-Congo certainly suggests that the Proto language from which these languages sprung had CIR. Kwa, West Benue-Congo and Plateau languages present possible instances of shared inheritance, the languages share either the same function or the same form (cf. 2.7.3, Table 2.5).

In all Kwa languages (cf. 3.3.6) found so far, the VRED is always agreeing in roundedness with the stem vowel. In addition, the VRED agrees in the feature [ATR] for languages with advanced tongue root harmony system (Anyin, Abidji, Akan, Fon). Almost all Kwa languages

are of the CIR Type IIIc pattern except from the Fon Abomey lect which is ranged under Type IIa as only the vowel [*u*] at the V_1STEM position effects the VRED.

4.3. The merit of typology to previous individual theories of CIR

For the past decades, CI-reduplication has instigated interesting and striking theoretical debates related either to the nature of the RED or to the mechanism triggering transfer of materials from the stem to the RED. The most studied and renowned language so far is Yoruba (cf. Delano 1965, Ogunbowale 1970, Awoyale 1989, Ihiunu & Kenstowicz 1994, Marantz 1982, Akinlabi 1985, 2004, Pulleyblank 1988, 2004, Kawu 1998, Archangeli & Pulleyblank 1989, Alderete & al. 1999, Raimy 2000, Inkelas & Zoll 2005, Downing 2006, Frampton 2009 and Reiss & Simpson 2009). The line of argumentation in this section will mainly rely on Yoruba data due to diverse accounts found in the literature. Problems raised by the Yoruba reduplication are representative enough to capture theoretical problems posed by CI-reduplication cross-linguistically.

Theoretically, 3 major approaches contrast with regard to Yoruba action/stative nouns:

- Phonological reduplication (Alderete & al. 1999, Kawu 1998, Akinlabi 2004)
- Morphological reduplication (Downing 2006, Marantz 1982, Pulleyblanck 1988)
- Morphophonological reduplication (Reiss & Simpson 2009, Frampton 2009)

The aforementioned studies testify the interest scholars have had the past decades in formalizing CI-reduplication. In either model, an emphasis is laid on the size and shape of the copied portion and on how the reduplicated material is transferred from the stem to the RED. In addition to this main goal, some studies highlight shortcomings in previous approaches suggesting formalized ways to ameliorate them (Pulleyblank 1988, Kawu 1998, Akinlabi 2008 and Reiss & Simpson 2009).

Alderete & al. 1999 (cf. 4.3.3.1) see the RED as a copy of the stem-initial consonant followed by an epenthetic vowel. Kawu 1998 and Akinlabi 2004 (cf. 4.3.3.2) consider reduplication in Yoruba as a repair rule that duplicates the stem onset in order to avoid onsetless-initial high-tone syllable. For Alderete & al. 1999, Kawu 1998 and Akinlabi 2004, Yoruba reduplication is a phonological process.

For Marantz 1982 (cf. 4.3.1) and Pulleyblanck 1988 (cf. 4.3.2), Yoruba action/stative nouns are obtained by prefixation of a CV- reduplicative morpheme subjected to additional prosodic

restrictions, an indicator that the RED is a morphological constituent.

For Reiss & Simpson 2009 (cf. 4.3.4) and Frampton 2009 (cf. 4.3.5), Yoruba action/stative nouns are obtained through a morphophonological process triggered by insertion of junctures. The projection approach by Reiss & Simpson lays a particular focus on the nature of the copied portion traditionally called 'reduplicant' and the parent material called 'base'. Reiss & Sympson rebuke the fact that reduplication in general should be analysed based on the correspondence Base-reduplicant as in OT for example, and they propose a model in which there is no base, no reduplicant, and in which the distinction between total and partial reduplication is neutralized (cf. also Frampton 2009).

4.3.1 CIR as a result of Prespecification

Marantz 1982 – following a proposal by McCarthy 1979, 1981 – in his studies of the Arabic verbal system – provides a formal account of reduplication in general, and of partial reduplication in particular. He uses the C-V skeleton model to reanalyse Yoruba CI-reduplication. Marantz argues that in order to account for reduplication in Yoruba, one should assume that fixed segments or features are attached to reduplicative templates; and that these fixed elements take precedence over the equivalent copying as exemplified in (9).

(9)

l ɔ	l ɔ	= lílɔ̄	dù̃	dù̃	= dídù̃
CV + CV			CV + CV		
í			í		
lɔ̄ 'go'			dù̃ 'be tasty, sweet'		

Marantz (1982: 449) concludes, with regard to (9) that the VRED in Yoruba is a fixed [í], and the complete set of distinctive features, necessary to yield this phoneme, are pre-attached to the V slot of the C-V skeleton.

Now take a look at (10) paying attention to the quality of the VRED when the V_1STEM is [ú].

(10) Yoruba (Akinlabi 2004: 288): Action nouns

a. High unrounded vowel stems

RedF	Gloss	Verb	Gloss
wí-wí	saying	< wí	say
dí-dì	tying	< dì	tie

b. High rounded vowel base

bí-bú ~ *bú*-bú	cursing	< bú	curse
kí-kū ~ *kú*-kū	butchering	< kū	butcher

The data in (10) shows that, in Yoruba, if the V_1STEM is [ú], the RED has two interchangeable allomorphs Cí- or Cú- (10a). The fact that the VRED can be [u] poses a problem to Marantz's 1982 approach in three ways.

First, the occurence of [ú] shows that the VRED is not always fixed, it alternates even if the alternation is not compulsory. The second problem is pointed out by Pulleyblank (1988: 264ff.) who, based on asymetrical and symetrical behavior of [i] in the Yoruba phonology, argues that the correct analysis for Yoruba data does not depend on prelinking, delinking, or restriction on copying. Rather, he argues that reduplication in Yoruba is accomplished via spreading and that there is therefore no evidence for using a reduplicative template with segmental prespecification. The third problem with Marantz C-V skeleton models has to do with data from Ondo Yoruba, a Yoruba dialect, where CV and V syllables are treated alike. The RED in Ondo Yoruba is either Cí- or í- depending on the shape of the stem (11).

(11) Ondo Yoruba (Orie 1997: 71): Action nouns

a. Consonant-initial stems

lí-lɔ̄	going	< lɔ̄	go
ʤí-ʤɛ̄	eating	< ʤɛ̄	eat

b. Vowel-initial stems

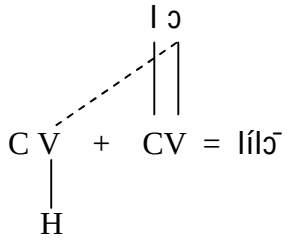
í-ɛ̀˜	walking	< ɛ̀˜	walk
í-ɛ́ʤɛ̄	cheating	< ɛ́ʤɛ̄	cheating

Considering the reduplicative template in Yoruba as Cí- poses a problem, for the reason that, it permits to account for the standard variant only, excluding cases in Ondo Yoruba where the RED is í-. It seems more accurate therefore to define the template in terms of a prosodic unit equivalent to a syllable rather than a C(onsonant) and V(owel) sequence.

4.3.2 CIR as a result of spreading

Pulleyblank 1988, unlike Marantz 1982, argues that the appropriate analysis for Yoruba reduplication does not depend on prelinking, delinking, or restrictions on copying, but it is rather accomplished via spreading as suggested by Steriade 1982 and McCarthy & Prince 1986 (10). He claims that under the spreading approach, the presence or absence of vowel specification does not pose a problem; and representing the vowel [*i*] with an empty root node matrix is beneficial in the sense that it permits to generate a unified approach to the asymmetric behaviours of vowel [*i*] in Yoruba phonology.

(12)



H in (12) stands for the fixed high tone borne by the VRED. Pulleyblank (1988: 267) argues, based on a range of asymmetric behaviour[42] exhibited in Yoruba by the vowel [*i*], that this vowel is completely unspecified in the underlying representation (cf. 13). He considers [*i*] to be the Yoruba unmarked or default segment.

(13) Yoruba vowel underspecification matrix

	i	e	ɛ	a	o	ɔ	u
[high]		-	-		-	-	
[Low]				+			
[Back]					+	+	+
[ATR]			-			-	

[42]These asymmetric processes are regressive assimilation, postlexical vowel deletion, syllabic nasal formation, consonant-induced harmony, loan incorporation, deletion of word-initialmid-toned [*i*], and denasalization.

To obtain fully specified representations from the underspecification matrix in (13), The redundancy rules in (14) are needed (cf. (15) for their application in the derivation of reduplicated items).

(14) Redundancy rules

a. [+low] → [-high]: Assign a [+low] to any non-high vowel

b. [ ] → [+high]: Assign a [+high] to a vowel not specified for this feature

c. [ ] → [-low]: Assign a [-low] to a vowel not specified for this feature

d. [+low] → [+back]: Assign a [+back] to any low vowel

e. [ ] → [-back]: Assign a [-back] to a vowel not specified for this feature

f. [+low] → [-ATR]: Assign a [-ATR] to any low vowel

g. [ ] → [+ATR]: Assign a [+ATR] to a vowel not specified for this feature

Pulleyblank's 1988 analysis of Yoruba reduplication is valuable and insighful. It successfully predicts how the VRED ends in [*i*], and the mechanism through which segments are transferred from the base to the RED, i.e., spreading. Yet, there is a reason to wonder whether the empty root node hypothesis really enables to explain[43] – with regard to the underspecified matrix in (13) – why the vowels [*i*] and [*u*] are qualified to spread their root node modifying the VRED (transparency), whereas the non-high vowels fail to do so (opacity). If the VRED is not prespecified [+high], how does one explain the fact that the RED agrees in backness (though not compulsory) with stems comprising the high unrounded back vowel [*u*] (cf. 10b), whereas it is Cí- for stems with non-high back rounded vowels. Put differently, if the rounded high back vowel [*u*] is not marked for the feature [high] as in (13), no motivated rule will justify or explain how this vowel might modify the VRED from [*i*] to [*u*], unless the default rule in (14b), that assigns a [+high] to a vowel not mark for this feature, applies earlier before reduplication as illustrated in (15).

(15) provides the derivation of búbú 'cursing', lílɔ̄ 'going'. At the underlying reprensentation (UR), only the roots are provided. They are linked to CV timing slots which in turn are prelinked to underspecified features. As hypothesized previously, the default rule in (14b) has to apply earlier before so that /u/ could be copied when reduplication applies. For lílɔ̄, no feature is prelinked to the root because in principle, non-high vowels do not effect the VRED.

[43]cf. 4.4 an alternative account of Yoruba CI-reduplication

Reduplication affixes a CV[+high] template that triggers transfer of materials from the stem to the RED via spreading. Default rules (14b), (14c), (14e) and (14g) apply at the end of the derivation in order to complete vowels' specification. For búbú, only default rules (14c) and (14g) are needed to complete the specification of the high back vowel borrowed from the stem. For lílɔ̄, because the empty root node receives no feature during the derivation, it takes the default rules (14b), (14c), (14e) and (14g) corresponding to the phonetic description of the unmarked [*i*]. The derivation ends in the output forms.

(15)

	bíbú	lílɔ̄
UR	/ bú CV +bk +hi	l ɔ̄ / CV
[ ] →[+high]		-
CIR	bú CV- CV [ ] +bk +hi	l ɔ̄ CV-CV [ ]
Spreading	bú CV- CV [ ] +bk +hi	l ɔ̄ CV-CV [ ]
Default rules	12c, 12g	12b, 12c, 12e, 12g
Phonetic representation	[búbúlílɔ]	

4.3.3 CIR in Optimality Theory

CI-reduplication has received some theoretical treatment in OT but under the label TETU (Kawu 1998) or fixed segmentism (Alderete & al. 1999, Akinlabi 2004). Fixed segmentism refers to the overwriting of an invariant segment (tone or feature) appearing where copying

might have been expected (Alderete & al 1999: 327). Generally, two major approaches contrast as far as Yoruba action and stative nouns are concerned: C*i*- as the result of the adjunction of a nominalizing prefix *i*- preceded by a copy of the base onset (Kawu 1998, Akinlabi 2004) vs. C*i*- with [*i*] as the result of "The Emergence of the Unmarked" (Alderete & al. 1999).

4.3.3.1 CIR as the result of "The Emergence of the Unmarked" (TETU)

Alderete & al. (1999: 336f.) describe the RED in Yoruba as comprised of a copy of the base onset combined with a fixed high tone [*i*]. They consider the VRED [*i*] – following Pulleyblank's 1988 intuition – to be similar in essence to the Yoruba default segment [*i*] inserted within loan words to disrupt an illicit or non-attested sequence of consonants (cf. 18). Alderete & al. (1999: 327, 336ff.) – building on McCarthy & Prince's 1986 proposal – argue that fixed segmentism in Yoruba has a phonological basis and falls under the OT rubric of "The Emergence of the Unmarked" (TETU) by McCarthy & Prince 1994 and propose the set of constraints in (16) to derive Yoruba action and stative nouns.

(16) MAX-V_{IO}: Input vowels have correspondents in the output (no deletion)

MAX-V_{BR} : Base vowels have correspondents in the reduplicant (no truncation)

DEP-V_{BR} : Reduplicant vowels have correspondents in the Base (no insertion)

H(*i*) : The least marked vowel is [*i*]

With respect to the set of constraints in (16), Alderete et al. argue that for [*i*] to emerge in the RED, the following ranking has to be respected: *MAX-V_{IO}>>H(i)>>MAX-VBR>> DEP-V_{BR}* (cf. (17) for illustration). That is, the constraint forbidding vowel insertion in the RED is lower ranked because less important than the others. The full base-reduplicant copying (MAX-V_{BR}) is less important than the constraint that requires [*i*] in the RED H(*i*). H(*i*) in turn is less important than the constraint demanding that each segments in the input should be represented in the output (MAX-V_{IO}), higher ranked.

(17)

/RED-*jɛ*/	MAX-V_{IO}	H(*i*)	MAX-V_{BR}	DEP-V_{BR}
a. → jí-jɛ̄		ɛ	ɛ	*i*
b. jɛ́-jɛ̄		ɛ. ɛ!		
c. jí-jī	ɛ!			

The constraints given in (16) are used to evaluate candidates (17a), (17b) and (17c). In (17a), it is observed that the base vowel is not copied (MAX-V_{BR} violation), and the unmarked [*i*] occurs in the RED, violating DEP-V_{BR}. However, Candidate (17a) is the optimal candidate because it does not violate the higher ranked constraint and it respect H(*i*). Though candidate (17b) does not violate MAX-V_{IO}, MAX-V_{BR} and DEP-V_{BR}, it cannot be the optimal candidate because it fatality violates H(*i*) which conditions the VRED to be [*i*]. Candidate (17c) exhibits a different kind of behaviour. The inserted vowel quality is copied back onto the base, maintaining perfect identity. It violates the higher ranked constraint MAX-V_{IO}. Consequently it fails to be the correct output (Alderete et al. (1999: 338).

4.3.3.2 CIR as a result of affixation + onset copy (repair rule)

Kawu (1998: 3), unlike Alderete & al. 1999, argues that "reduplication in Yoruba is not initiated by the abstract morpheme RED but by the need to realize a meaningful but segmentless affix". Put differently, the fixed high tone í- is considered a nominalizing prefix whose affixation to any given base creates a forbidden construction, i.e. a high tone vowel-initial word. Reduplication thus applies as a repair rule to satisfy the phonological constraint that forbids onsetless high tone vowel-initial syllables in standard Yoruba (cf. Kawu 1998: 3 and Akinlabi 2004: 285).

Akinlabi (2004: 274, 280) and Kawu (1998: 28) further note that the vowel [i] surfacing in loan words should be definitely distinguished from that of the RED for two reasons. First, the Yoruba nominalizing morpheme is always a high tone í-. Second, the epenthetic vowel in labial environments turns to [*u*] (18b).

(18) Yoruba (Pulleyblank 1988: 247f.): Loan words

a. Loan words with inserted [*i*]

gírámà	< grammar
dírɛ́bà	< driver

b. Loan words with inserted [*u*]

búrɛ́dì	< bread
súkúrù	< school

From Kawu's and Akinlabi's argumentation, one retains that the high tone í- in Yoruba action/stative nouns is an affix provided by morphology rather than an epenthetic vowel emerging form TETU. A basic phonological property that Kawu 1998 and Akinlabi 2004 rely on to distinguish between affixal and epenthetic *i*, is that the former is fixed and the latter is subjected to variation.

The analyses of Kawu 1998 and Akinlabi 2004, however, face a problem with respect to additional data by Akinlabi (2004: 287ff.) on Yoruba action/stative nouns where the supposed nominalizing prefix alternates between í- and ú-. Akinlabi notes that, if the verbal stem contains a high vowel [*i*] or [*u*], the nominalizing prefix preceded by the stem onset copy looks, strangely enough, like the stem-initial CV. Examples (8) is repeated here as (19) for clarity purposes.

(19) Yoruba (Akinlabi 2004: 288): Action nouns

a. High unrounded vowel stems

RedF	Gloss	Verb	Gloss
wí-wí	saying	< wí	say
dí-dì	tying	< dì	tie

b. High rounded vowel stems

bí-bú ~ *bú*-bú	cursing	< bú	curse
kí-kū ~ *kú*-kū	butchering	< kū	butcher

In the light of the asymmetry in the realization of the noun prefix depicted in (19), Akinlabi (2004: 290) conludes that Yoruba deverbals are derived differently depending on the height of the stem vowel. He claims that for non-high vowel roots, the prefix í- is simply a nominalizing affix; and for high vowel roots the entire CV- prefix is at the same time a copy of the base and an input morpheme.

The general typological claim sustained within this research is that CI-reduplication is formed by prefixing a string of segments made up of a copy of the C_1STEM followed by a fixed high vowel. In all languages with CIR found so far, both high and non-high vowel stems are derived via the same morphophonological process with the exception that the RED vowel is always high. Though Kawu 1998 and Akinlabi 2004 make valuable contributions shedding more light on Yoruba deverbals, yet, their analyses do not do justice to the correlation

between the RED and the stem as displayed accross languages. The approach adopted by Kawu 1998 and sustained by Akinlabi 2004 which stipulates that í- is an invariable nominalizing affix does not hold in the light of forms in (19b). More so, the forms in (19b) likely constitute a proof that the 'so-called nominalizing prefix' í- occurring in the RED in Yoruba is also subjected to alternation like the epenthetic í, even though the properties triggering variation are not quite the same. Akinlabi's 2004 proposal that the entire CV- prefix is a RED for high vowel stems, and a noun prefix preceded by a copy of the stem onset for non-high vowel stems does not quite explain why both cases should be distinct in Yoruba, rather than being unified within a single approach. These facts suggest that Pulleyblank's 1988 proposal – that Yoruba reduplication does not depend on prelinking, delinking, or restrictions on copying, but rather that it is accomplished via spreading– may be more accurate.

4.3.4 CIR as a Projection

Reiss & Simpson (2009: 2) develop a model of reduplication built on Frampton 2004, Raimy 2000 and especially on Halle 2008 previous accounts of reduplication. Central to their approach (Reiss & Simpson 2009: 4ff.) is that Reduplication is a morphopholonological process comprising a set of rules – insertion of junctures[44] (square brackets, braces and angle brackets interpreted by phonology, in order to specify the nature of projections and delimit their domain of application – appliable to any given input in order to derive the equivalent output. They consider it a fundamental mistake to rely essentially on the correspondence Base-RED to account for reduplication, as it is done in OT or in simple descriptive reduplication analyses. Reduplication, according to Reiss & Simpson, involves projection of a string S into a structure containing linearly ordered full and partial copies of S. That is, they propose a model in which there is no base and reduplicant in reduplication surface forms; and where reduplication is viewed as a projection comprising a maximal projection (an input) dominating a left- and a right-branch copies of the input (cf. 22). None of the left- or right-branch copy has priority as the base to which the other is affixed.

Based on their claims, Reiss & Simpson propose a reanalys is of Yoruba action/stative nouns (20) drawn from Akinlabi 1984 and Pulleyblank 1988.

[44]cf. Reiss and Simpson 2009 for more insight on how junctures are used to project different reduplication patterns.

(20) Yoruba (Akinlabi 1984 and Pulleyblank 1988): Stative nouns

RedF	Gloss	Verb	Gloss
gbí-gbóná	heat	< gbóná	be hot
dí-dárā	goodness	< dárā	be good

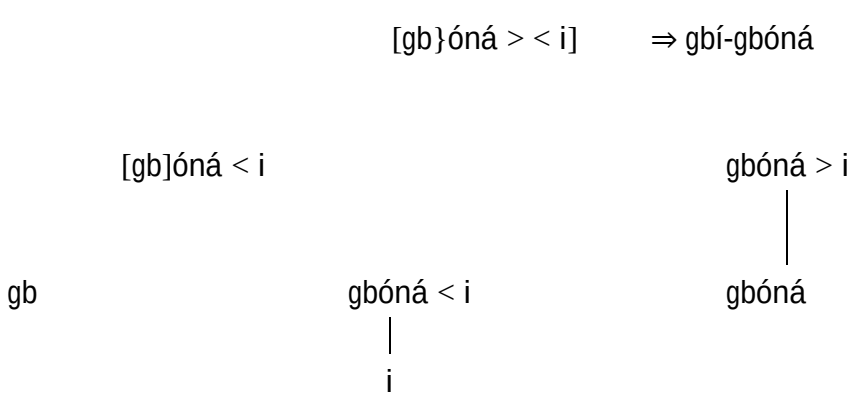
Reiss & Simpson (2009: 21f.) agree with Alderete & al. 1999 that nominalization in Yoruba involves a reduplicative morpheme with a fixed [*i*], irrespective of the the base vowel. In addition, they argue that Yoruba action and stative nouns can be accounted for with ease with respect to the following combined juncture insertion rules:

- Insert a [at the left edge of the root and a] at its right edge;
- Insert a } juncture after the onset;
- Insert a > before the end of Dup-Domain (before]);
- Insert a < before the end of the Dup-Domain, following <[sic];
- Insert templatic /*i*/ before the].

Considering gbóná as the input, the aforementioned morphological rules yield the structure in (21) projected by phonology as in (22):

(21) gbóná⇒ [gbóná] ⇒ [gb}óná] ⇒ [gb}óná >] ⇒ [gb}óná > <] ⇒ [gb}óná > <i]

(22)



In (22), the DUP-DOMAIN is larger than a morpheme, it comprises both the input and the nominalizing prefix *i-* added at the end of the input. Inverted angle brackets are used to mark a kind of morphological metathesis (Reiss & Simpson 2009: 16). Inverted brackets permit to move *i* from the right edge of Dup-Domain to its left edge. At the end of the derivation, only material from the right edge of the Dup-Domain (*i*) results from the L-PROJ and only material from the left edge of the DUP-DOMAIN (gbóná*)* results from the R-PROJ. The right brace }

coming immediately after the onset *gb* signals that this segment constitutes a secondary DUP-DOMAIN in the L-PROJ. The secondary DUP-DOMAIN [*gb*] – result of the insertion of the right brace in the primary DUP-DOMAIN – triggers the copy of the onset of the input permitting thus to obtain the right output gbí-gbóná.

An alternative and equally viable analysis for Yoruba deverbals could simply involve the more restricted DUP-DOMAIN and a single juncture [< i gb]óná illustrated in (23) (Reiss & Simpson 2009: 21f.).

(23) [i < gb]óná ⇒ gbí-gbóná

i < gb igb
|
gb

The major distinction between the representation in (22) and that in (23) is that, in (22), the entire base is projected both in the left- and right- branches of the maximal projection, whereas in (23), only part of the base is projected in both branches. In (23), the nominalizing morpheme *i-* is added at the left edge of the input unlike in (22), where it rather occurs at the right edge. DUP-DOMAIN comprises *i* and the input onset *gb* occuring both in the L- and R-PROJ. The left angle bracket is used to project the material at its right, i.e. *gb*, in the L-PROJ. Linearization of the material in both the L- and R-PROJ coupled with the non-reduplicated segments of the input permit to derive the output gbí-gbóná.

Reiss & Simpson show that it is possible to account for reduplication in general and for Yoruba deverbals in particular using projects coupled with juncture insertion to derive reduplicated surface forms from simple inputs without also positing abstract 'base' and 'reduplicant' categories. On the other hand, Reiss & Simpson (2009: 12, 21) acknowledge the fact that their approach, like previous accounts on which they rely, suffer from a surfeit of solutions and leaves opened many questions. Reiss & Simpson (2009:5) hold it that the DUP-DOMAIN, once defined by brackets inserted by morphology, is purely phonological, and the mechanism of double projection helps to avoid many superficially divergent patterns. As a matter of fact, the difference between infixation, prefixation and suffixation highlighted in other models disappears, as does the distinction between total and partial reduplication of morphological units (Reiss & Simpson, 2009:7). It should, however, be noted that the

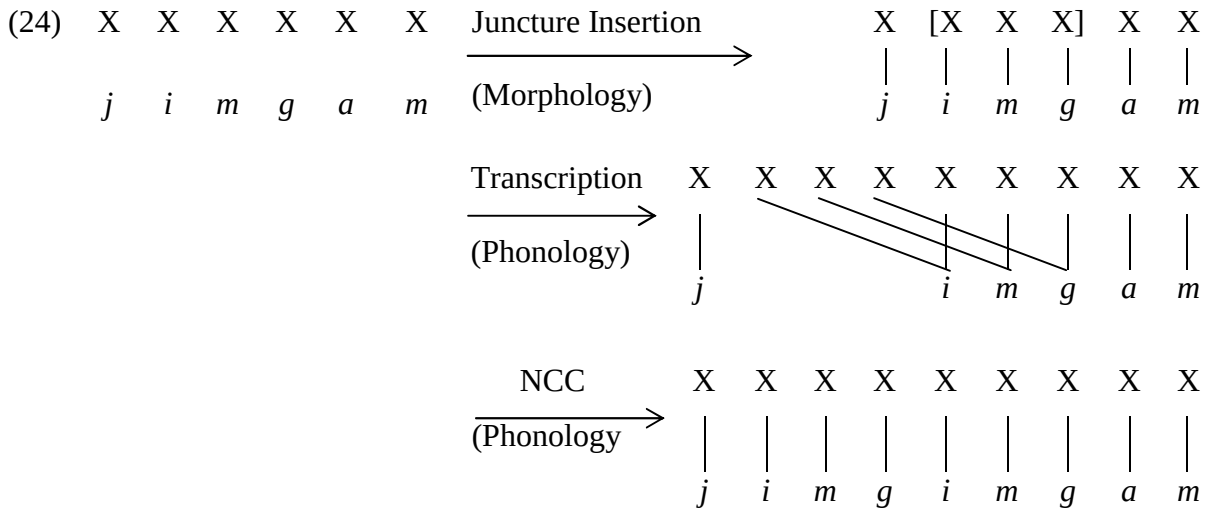
vulnerable heel of Reiss & Simpson's Achilles is their non-recognition of base and reduplicant as essential components of any given reduplicative. Discarding the aforementioned categories makes it difficult for them in their analysis to mark a clear distinction on the role played by morphology and phonology in deriving reduplicated forms. Actually, if there is no base and no affix, what is the nature of the inserted *i* in (19-21) knowing that it is used in Yoruba to obtained action/stative nouns? In the absence of a clear distinction between prefixation and suffixation, Reiss & Simpson (2009: 21) have no choice than proposing the derivations in (22) and (23) where *i* occurs either at the end of the 'input' or at the beginning. The choice of using any of the two derivations becomes therefore arbitrary giving the possibility to wonder whether it will be totally wrong to propose a third solution where *i* originates as an infix.

4.3.5 CIR in Distributed Morphology

Distributed Morphology [Hereafter DM], as articulated in Frampton 2009, considers reduplication to be a morphophonological process "similar in essence to the way that English phonology uses its vowel-lowering capability to modify sing to sang to mark past tense" P[1].

Reduplication in DM is viewed as the surface manifestation of nonconcatenative inflectional morphology, rather than an affixal process, originating from juncture insertion marked by square brackets in the derivation of *j-img-imgam* 'knowledgeable people' < *jimgam* 'knowledgeable person' from Mangarayi; see (24). Frampton (2009: 5) considers juncture insertion to be the initial operation of the full copying process instigated by morphology, that marks the portion of any given base subjected to duplication. He argues that juncture insertion is followed in turn by two compulsory phonological rules, namely, transcription, that copies and linearizes the timing tier (removing t-junctures), links each X slot to the appropriate phonemic segment in the base; and the No Crossing Constraint (NCC) which intervenes to repair the violation caused by Transcriptions, that is linking lines, that cross (cf. 24). The copying process, in prose, is simple to be characterized as start to the left/right of X segment, copy up to the left/right of Y segment (Frampton 2009: 3).

(24)



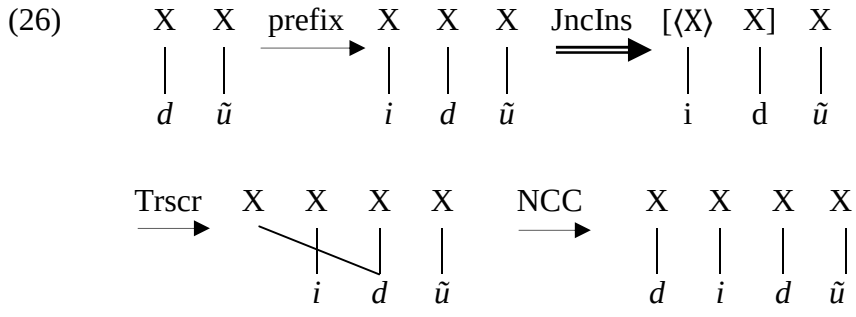
Truncated reduplication is considered in DM as a phonological readjustment rule operating simultaneously with transcription (Frampton 2009: 52). Truncation is marked in the derivation by the truncation junctures < and > which are used to isolate segments that are truncated or not copied. Consider the examples in (25) from Frampton (2009: 54) citing Marantz (1982:449).

(25) Yoruba (Marantz 1982: 449): Action/stative nouns

RedF	Gloss	Verb	Gloss
li-lɔd	going	< lɔd	go
di-dũ	sweetness	< dũ	sweet

As Akinlabi 2004, Frampton (2009: 54) considers *i-* to be a nominalizing prefix in Yoruba; and juncture insertion (transcription and truncation) to apply after the prefix has been adjoined to the stem (26).

(26)



Though Frampton's Distributed Reduplication approach accounts for nominalization in Yoruba, of course for cases where the 'nominalizing prefix' is *i-*, it fails in saying nothing about forms involving u- rather (cf. 19b) as the noun prefix, or in forms where the base vowel

spreads nasality on to the so-called nominalizing affix or fails to do so, cf. 3.3.1.1, example (13).

In sum, the proliferation of models dealing with CI-reduplication could be perceived as a consequence of the lack of sufficient data in synchronic analyses, and the lack of a typological analysis of CI-reduplication. It could also mirror how varied and complex CI-reduplication is across languages. Putting more emphasis in formalizing CI-reduplication omitting sometimes its semantic functions; limiting oneself to the description of CI-reduplication within a single language or few languages relying on very few and non-representative data of the various forms attested within a given language or across languages is not enough to apprehend the process with all its ramifications.

Therefore, any good model on CI-reduplication per se should be first and foremost able to uniquely represent or account for each formal and functional pattern in any given language. Generally, as it should be able to differentiate total vs. partial reduplication, so should it be able to distinguish CI-reduplication from other type of partial reduplication.

Secondly, a good model of CI-reduplication also needs to account for different patterns of segmental and suprasegmental alternations observed across languages. This involves cases where the RED allomorphy is triggered by the V_1STEM or the C_1STEM or by both and cases of fixed or variable tones borne by the RED.

4.4 Yoruba CI-reduplication: an alternative analysis

The combination of slightly revised versions of Marantz's C-V skeleton with Pulleyblank's underspecification approaches gives a model that accounts neatly for CI-reduplication in Yoruba.

I follow Marantz 1982 in assuming that the approach that best accounts for CI-reduplication is that in which it is considered as a normal affixation process with the exception that the RED more or less resembles the stem to which it is attached. I agree, in part, with Marantz (1982 : 449) who argues that "Yoruba (Delano 1965) forms nouns from verbs by prefixing a CV- skeleton whose V is a fixed *i*...the complete set of distinctive features necessary to yield the phoneme /*i*/ is so attached". I propose to revise Marantz statement to read "Yoruba forms nouns from verbs by prefixing a Ci- RED which optionally agrees in backness with the V_1STEM if the latter is the high back unrounded vowel [u]".

Without completely discarding Pulleyblank's 1988 empty root node hypothesis as underlying specification for the default vowel [*i*] in Yoruba, I propose that the RED in Yoruba, as well as across languages, should be CV[+high] as suggested by Faraclas & Williamson 1984 rather than CV[ ]. I also agree with Pulleyblank's 1988 proposal that CI-reduplication is achived via spreading rather than copying. Yet, the problem encountered with forms taking Cú- as the RED remains unsolve. Why is [*u*] the only back rounded vowel that can optionally occur within the RED? What motivates the prior application of the default rule in (14b), that assigns a [+high] to a vowel not mark for this feature?

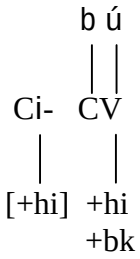
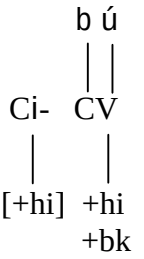
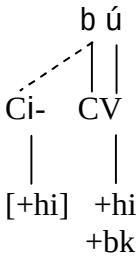
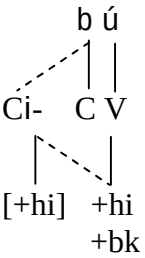
The answer seems simple. Yoruba is of the CIR Type IIa pattern, same as in Fon of Abomey, the type of language where only the high, back, rounded vowel [*u*] conditions the RED to turn to C*u*-, though optional in Yoruba. Optionality is marked by the non-spreading of the feature [+round] (cf. 28), and it shows that CI-reduplication is undergoing a change, it is certainly shifthing to a fixed C*i*- RED, or the other way round, i.e. from a fixed RED to a variable RED.
To remedy the problem posed by [*u*], I propose to modify Pulleyblank's vowel underspecification matrix in (13) by marking [*i*] and [*u*] for the feature [high] in order to distinguish them from the other non-high vowels; and non-high back vowels with repect to [*u*] (cf. 27). Since all non-high vowels in Yoruba are underspecified [-high], they cannot effect the VRED [*i*] which is underspecified [+high].

(27) Revised Yoruba vowel underspecification matrix

	i	e	ɛ	a	o	ɔ	u
[high]	+	-	-		-	-	+
[low]				+			
[round]					+	+	+
[ATR]			-			-	

(28) provides the two possible ways of deriving bíbú ~ búbú 'cursing' < bú 'curse'. In the underlying representation (UR), the verb roots are linked to CV timing slots which in turn are prelinked to the underspecified features of the V_1STEM. Reduplication affixes the C*i*- RED which optionally assimilates backness in the second cases. Subsequently, default rules applies to complete the VREDs specification. For bíbú, because the VRED remains unmodified, it takes the default rules (14c), (14e) and (14g) corresponding to the phonetic description of the vowel [*i*]. For búbú, only the default rules (14c) and (14g) are required.

(28)

	bíbú	búbú
UR		
CIR		
Assimilation		
Default rules	12c, 12e, 12g	12c, 12g
Phonetic representation	[bíbú]	[búbú]

CONCLUSION

Quite a number of West African languages of diverse filiation utilize CI-reduplication – A certain type of CV-reduplication, not found in other areas worldwide so far, which consists of prefixing to a given stem a copy of its onset followed by a high vowel irrespective of the V_1STEM height – for derivational and inflectional purposes. While the stem-initial consonant is duplicated, the vowel of the reduplicant is not always a faithful copy of the stem nucleus, but is rather pre-specified as high, agreeing in backness and roundedness with the V_1STEM to different extents, depending on the individual languages phonological and Ci-reduplication systems. In both parameters, i.e. shape (impact of neighboring segments, vowels and consonants, onto the underspecified high vowel of the RED; tonal alternations) as well its semantic function (intensification, nominalization), CI-reduplication shows a considerable degree of cross-linguistic variation. This study addressed the phenomenon of CI-reduplication aiming at providing an in-depth description of CI-reduplication in West Africa integrated into a unified framework, and attempting a typological categorization of its formal and functional parameters of variation, plotting their geographical distribution.

From a formal perspective, 3 types of CI-reduplication were identified, CIR Types I, II, and III depending on whether the reduplicant vowel is fixed, quasi fixed, or variable; and whether it is the stem vowel, initial consonant, or both segments which assimilate the VRED. In CIR Type I languages – Emai, Arigidi (Type Ia); Bafut, and Vengo (Type Ib) – the reduplicant comprises a copy of the stem-initial consonant followed by a fixed vowel. For languages with a variable RED, i.e. CIR Types II and III, it has been observed across languages that the RED allormorphy is conditioned by three major factors namely, height (high vs. non-high vowels), place of articulation (front vs. central vs back vowels), and roundedness (round vs. unrounded vowels) assimilations. In CIR Type II languages – Yoruba, Fon (abomey lect excluded) (Type IIa), Oko, and Hyam of Nok (Type IIb) – the RED assimilates roundedness in the presence of the high, back rounded vowel [*u*] in the stem. In Oko, CIR Type IIb, [*u*] must be preceded by the labio-dental fricative [*f*]. In CIR Type IIIa languages – Makaa, Krumen, Igbo, Fe'fe', Fyam, Obolo, and Ninzo – the RED allomorphy is primarily determined by Yes/No the stem vowel is high. High vowel stems always take a RED identical to their initial syllable; and non-high vowels stems, a defaut RED that may be impacted by labials, palatals, glides, or labio-velarized segments depending on individual languages' CIR system. In CIR Type IIIb

languages, Kutep and Tarok, languages with a three-way phonemic vowel contrast, i.e. front vs. central vs. back, the RED is C*i*- for front vowel stems, C*ɨ*- for central vowel stems, and C*u*- for back vowel stems. In CIR Type IIIc languages –Nupe, Hyam of Nok, Abidji, Attié, Anyin, Fon of Abomey, Kulango, Akan, Isu, Ron, and Ningye – The presence of a rounded vowel within a stem always yields a C*u*- RED that may agree in tenseness for languages with ATR harmony. Note that stem-initial consonant may also effect the VRED in CIR Type IIIc languages.

From a functional perspective, CIR is used across languages to mark a wide range of functions with or without iconic motivation. CI-reduplication functions with iconic motivation include: (i) duration (Emai, Vengo, Daffo [Ron], Hyam of Kwoi, and Fe'fe'), (ii) plurality (Akan, Obolo, Mwaghavul, Ron, Ninzo, Ningye, Hyam of Kwoi, Arigidi, and Fyam), (iii) adverb intensification (Vengo, Fon, Abidji, Beezen and Tarok), (iv) adjective intensification (Tarok and Isu), and (v) diminution (Makaa, Tarok and Fe'fe'). The CI-reduplication function with non-iconic motivation is exclusively reserved for lexicalization. It includes the creation of: (i) action and stative nouns (Oko, Yoruba, Fon (Abomey lect excluded), Nupe, Krumen, Kutep and Igbo), (ii) nouns referring to people/object/thing (Bafut, zhoa, Isu, Hyam of Nok, Ninzo, Obolo, Makaa, Kutep, Ron, Igbo and Fe'fe'), (iii) nouns and adverbs from a female's stylish language (Tarok), (iv) verbs (Hyam of Nok, Akan, Ron Obolo, Makaa), (v) verbal adjectives describing state, odours and taste (Makaa, Tarok and Fon), (vi) adverbs (cf. Makaa, Ninzo, and Zhoa), and (vii) reflexive pronouns (Tarok).

With respect to contact linguistics in Africa, this study shows that CIR cuts across major phylogenetic boundaries in its distribution in Central Western Africa, It is definitely more widespread in Niger-Congo languages with a hot-bet in Cameroon and Nigeria, totalizing 22 languages out of the 29 found so far. Its limited distribution in the Western branch of Chadic within Chadic points to a direction of contact-induced diffusion from Niger-Congo to chadic in local scenarios, more precisely in Plateau. This is also supported by general findings pertaining to the spectrum of functions, since in Chadic representatives, Ron and Mwaghavul, the attested functions of CIR are much more limited to plural marking with clear iconic motivation, whereas in Niger-Congo the spectrum of functions is much broader.

With respect to diachronic linguistics, the detailed typology of CI-reduplication in three types suggests a progressive proliferation of allomorphy and increase of conditioning factors. The ongoing mutations observed in Obolo, Ningye, Ninzo, Yoruba, Hyam of kwoi; the palatal infix in Isu seem to suggest that CIR constitutes an intermediary stage in a historical process

including several stages along a cline that can be summarized as follows: Full reduplication → partial reduplication (CVC_0) → prespecification (e.g: Cə/Ca/CI) → loss of the reduplicate C (as in Isu).

For some languages, Igbo (cf. 3.3.1.2), Ningye (cf. 3.3.2.1), Fyam (cf. 3.3.2.4), Kutep (cf. 3.3.3) and Obolo (cf. 3.3.4), it was observed that the first consonant in a root has an impact on the shape of the vowel in the reduplicant due to the fact that some consonant qualities allow for the spreading of labiality and rounding while other don't. In Igbo for example, just to name the least, The RED is C*i*-/C*ɪ*- when the stem/initial consonant is a coronal obstruent (1a), and C*u*-/C*ʊ*- when it is a coronal sonorant, or a labial (1b/c).

(1) Igbo (Ihiunu & Kenstowicz 1994: 2f.): Action nouns

a. Roots with coronal obstruent onsets and non-high vowels

sì-sè	stirring	< sè	stir (water)
sɪ́-sʊ́	pricking	< sʊ́	prick
ṭɪ́-ṭá	biting	< ṭá	bite
ʧɪ́-ʧɔ́	wanting	< ʧɔ́	want

b. Roots with sonorant onsets and non-high rounded vowels

nì-nɔ̀ ~ *nɔ̀*-nɔ̀	staying	< nɔ̀	stay
rì-*rɔ̀* ~ *rù*-rɔ̀	settling	< rɔ̀	settle

c. Roots with labial onsets and non-high vowels

mú-má	knowing	< má	know
fú-fó	uprooting	< fó	uproot
fʊ́-fɔ́	remaining	< fɔ́	remain
gbú-gbé	crawling	< gbé	uproot

A samilar phenomenon is observed in Fyam, Obolo and Kutep where coronals, in general, systematically block labiality to span while velars and labials do not. Against this background it seems weird and counter-intuitive why coronals are transparent to labiality spreading whereas labials and velars are opaque. Such a blocking behavior is expected from secondary articulations on consonants (labialization, palatalization, velarization) as shown within this work (cf 2.7.1.4.1, 2.7.1.4.2, 2.7.1.4.4), but in Fyam, Obolo, Kutep, Ningye and Igbo, the coronal versus labial, velar contrast concerns the primary articulator.

Hyman 1973 encountered the same puzzling situation in his analysis if ‘high vowel reduplication’ in Fe’fe’. To solve the problem, he proposed that the Jakobsonian feature [grave] – claiming that labials, velars and back vowels on the one hand, and alveolars, palatals and front vowels on the other hand form distinct natural classes – discarded by Chomsky & Halle 1968, should be reincorporated into universal set of distinctive features used by languages. There is no doubt that this study, through the empirical facts from the aforementioned languages, provides unequivocal facts that empowers Hyman’s 1973 intuition regarding reincorporation of the Jakobsonian feature [grave]. A question however remains unanswered. What qualities or properties makes grave consonants opaque, and non-grave consonants transparent?

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APPENDIX I: List of cited languages

The table below provides some key information on languages cited within this study. The compilation of information given here are from Lewis, Simons & Fennig 2015.

Name	Location	Region	Genealogy
Abidji	Côte d'Ivoire	Lagunes region, Agneby region southwest of Agboville	Niger-Congo; Kwa
Abron	Ghana/ Côte d'Ivoire	Southwest and northwest of Asante Twi language area	Niger-Congo; Kwa
Agta	Philippines (Islands)	Northeast Luzon	Austronesian
Akan	Ghana	Accra and some neighboring regions. Also in Canada	Niger-Congo; Kwa
Anyin	Côte d'Ivoire /Ghana	Lagunes and South-Comoé regions. Also in Ghana	Niger-Congo; Kwa
Arigidi	Nigeria	Ondo State, Akoko North LGA; Kogi State, Kogi LGA	Niger-Congo; West Benue-Congo
Attié	Côte d'Ivoire	Anyama and Alepe subprefectures; Agnebi Region	Niger-Congo; Kwa
Bafut	Cameroon	Mezam division, Tuba subdivision, Bafut	Niger-Congo; Bantoid, Ngemba
Beezen	Cameroon	North West Region, Menchum division, Kpep (Beezen)	Niger-Congo; Jukunoid
Bekwarra	Nigeria	Cross River State, Ogoja LGA	Benue-Congo; Cross River
Bembele	Cameroon	Center and East Regions	Benue-Congo; Bantoid, Narrow Bantu
Bikol	Philippines (Islands)	Central, Libon, Miraya, Rinconada...Bikol	Austronesian
Bokkos		Plateau State, Bokkos LGA, PMangu LGA,Nassarawa	chadic, west
Chamorro	Guam	Guam, Northern Mariana Islands, United States	Austronesian

Name	Location	Region	Genealogy
Daffo	Nigeria	Plateau State, Bokkos LGA	Chadic, west
Ega	Côte d'Ivoire	South-Bandama Region, Borondoukou village near Gly	Niger-Congo; Kwa
Emai	Nigeria	Edo State, Owan LGA	Niger-Congo; West Benue-Congo
Ewe	Ghana/Togo	Southeast corner	Niger-Congo; Kwa
Fe'fe'	Cameroon	West Region, Upper Nkam division	Niger-Congo; Bantoid, Bamileke
Fijian	Fiji	East half of Viti Levu and eastern offshore islands	Austronesian
Fon	Benin/Togo	Zou and Atlantic departments. Togo in Plateaux Region	Niger-Congo; Kwa
Fyam	Nigeria	Plateau State, Jos, Barkin Ladi, and Mangu LGAs	Niger-Congo; Plateau
Fyer	Nigeria	Plateau State, Mangu LGA, Fyer district	Chadic; West
Grebo	Liberia	cf. Grebo Barclayville, central, northern, soutern, Gboolo	Niger-Congo; Kru
Greek	Greece	Greece, Ukraine, Albania, Cyprus, Hungary...	Indo-European
Gwandara	Nigeria	Niger State; Nassarawa State	Chadic;West
Hyam	Nigeria	Kaduna State, Kachia and Jema'a LGAs	Niger-Congo; Plateau
Igbo	Nigeria	Anambra State; Enugu State, Imo State; Delta State	Niger-Congo; Igboid
Ilokano	Philippines	Northwest Luzon, La Union and Ilocos provinces	Austronesian
Isu	Cameroon	Menchum division, Wum Central subdivision	Niger-Congo; Bantoid, Ring

Name	Location	Region	Genealogy
Krumen,Tépo	Côte d'Ivoire/Liberia	Bas-Sassandra Region. Also in Southeast of Liberia	Niger-Congo; Kru
Kulere	Nigeria	Plateau State, Bokkos LGA	Chadic; West
kulango	Côte d'Ivoire/Liberia	Zanzan District, Nassian subprefecture	Gur
Kutep	Nigeria/Cameroon	Taraba State. Also in North West Region of Cameroon	Niger-Congo; Jukunoid
Lagwan	Cameroon/Chad	Logone river bank across to Nigeria border	Chadic; Biu-Mandara
Lamang	Nigeria	Borno State, Gwoza LGA; Adamawa State, Michika LGA	Chadic; Biu-Mandara
Latin	Vatican State	_	Indo-European
Lushootseed	United States	Washington, Puget Sound area	Salish
Mangarayi	Australia	Northern territory, Mataranka and Elsey stations.	Australian, Gunwingguan, Mangarayic
Makaa	Cameroon	Upper Nyong and the Nyong and Mfoumou divisions	Niger-Congo; Bantoid, Narrow Bantu
Mbe	Nigeria	Cross River State: Ogoja LGA	Benue-Congo, Bantoid, Southern
Mubi	Chad	Guera Region; also large area in Batha Region	Chadic; East
Musgu	Cameroon/Chad	Mayo-Danay, Maga subdivisions/Bongor	Chadic; Biu-Mandara
Muyang	Cameroon	Far North Region, Mayo-Sava division	Chadic; Biu-Mandara
Mwaghavul	Nigeria	Plateau State, Barakin-Ladi and Mangu LGAs	Chadic; West
Nakanai	Papua New Guinea	West New Britain Province, Hoskins district	Austronesian
Ningye	Nigeria	Kaduna State	Niger-Congo; Plateau
Ninzo	Nigeria	Kaduna State; Nassarawa State	Niger-Congo; Plateau
Nupe	Nigeria	Niger State; Kwara State	Niger-Congo; West Benue-Congo

Name	Location	Region	Genealogy
Nzéma	Côte d'Ivoire/ Ghana	Southwest corner	Niger-Congo; Kwa
Obolo	Nigeria	Rivers States; Akwa Ibom State	Niger-Congo; Cross River
Oko	Nigeria	Kogi State	Niger-Congo; West Benue-Congo
Ron	Nigeria	Plateau State	Chadic; West
Samoan	Samoa	_	Austronesian
Semai	Malaysia	Northwest Pahang, south Perak states, north Selangor State	Austro-Asiatic
Sha	Nigeria	Plateau State, Bokkos LGA, Sha district	Chadic; West
Swati	Swaziland	_	Benue-Congo; Bantoid, Narrow Bantu
Tagalog	Philippines	Manila, most of Luzon, and Mindoro	Austronesian
Tarok	Nigeria	Plateau State; Taraba State, Wukari LGA	Niger-Congo; Plateau
Tikar	Cameroun	Center Region; Adamawa Region; West Region	Benue-Congo; Bantoid, Southern
Tuvan	Russia/China	Southern Siberia; Tyva Republic and Krasnoyarskiy Kray	Atlaic, Turkic
Vengo	Cameroon	Ngo Ketunjia division, Ndop subdivision	Niger-Congo; Bantoid, Ring
Weh	Cameroon	North West Region, Menchum division, Weh village	Benue-Congo; Bantoid, Ring
Yoruba	Nigeria/Benin	also present in Sierra Leone, Togo, U.K. and U.S.	Niger-Congo; West Benue-Congo
Zhoa	Cameroon	Menchum division, Fungom subdividion	Niger-Congo; Bantoid, Ring

Appendix II: Abstract in German

Die CI-reduplikation [im Folgenden CIR] ist ein in den westafrikanischen Sprachen weit verbreiteter Prozess. Er besteht darin, einem Stamm zu grammatikalischen Zwecken die Kopie seines Silbenanlauts gefolgt von einem hohen Vokal zu präfigieren.

Diese Dissertation verfolgt zwei Ziele. Zum Ersten bietet sie eine gründliche Beschreibung der formellen und funktionalen CIR-Typen einschließlich einer sprachübergreifenden Untersuchung der Beziehung zwischen Formen und Funktionen von CIR. Zum Zweiten greift sie frühere Analysen der CIR wieder auf, bekräftigt einige der dort getroffenen Behauptungen und schlägt für andere Verbesserungen in Richtung einer vereinheitlichten Herangehensweise an das Thema CIR vor.

Im Hinblick auf das erste Ziel belegt die vorliegende Untersuchung die Verbreitung der CIR in den beiden Sprachphyla Afroasiatisch (Westtschadisch) und Niger-Kongo. Formal betrachtet lassen sich sprachübergreifend drei Muster in Abhängigkeit von der Allomorphie des Reduplikanten (RED) unterscheiden: Sprachen mit einem unveränderlichen RED (CIR Typ 1); Sprachen mit einem beinahe variablen RED, das die Rundung wahlweise oder in eingeschränkter labialer Umgebung anpasst (CIR Typ II); sowie Sprachen mit einem veränderlichen RED, in Abhängigkeit von der Hebungsstufe des Stammvokals und des sekudären Modifikationstyps des Silbenanlauts (CIR Typ III). Was die Funktion anbelangt, so wird gezeigt, dass die CIR zur Markierung verschiedener Kategorien dient, die ikonische Motivation beinhalten können (wie z.B. die Zu- oder Abnahme von Menge oder Qualität) oder sie vermissen lassen, wie beispielsweise im Falle der Wortbildung.

Hinsichtlich des zweiten Ziels wird argumentiert, dass die CIR als sprachübergreifendes Phänomen am besten analysiert warden kann, wenn man sie als morphophonologischen Prozess begreift, bei idem ein prosodisch unterspezifiziertes CV[+hoch] Morphem affigiert wird. Die Untersuchung beruht im Wesentlichen auf den Daten, wobei der gewählte Ansatz Typologie mit neuen Entwicklungen aus der Generativen Grammatik (Unterspezifizierung, Merkmalstheorie, autosegmentaler Phonologie) verknüpft, um die Reduplikation hoher Vokale zu erklären. Die Verwendung einer rein deskriptiven Herangehensweise hat sich als vorteilhafter erwiesen. Sie ermöglicht die Behandlung sehr reichhaltiger und unterschiedlicher Formen von CIR-Mustern ohne daran gebunden zu ein, einen neuen theoretischen Hintergrund erschaffen oder eine neue ad-hoc Regel aufstellen zu müssen, die dann in bestimmten Umgebungen keine Anwendung finden, auch wenn die Geltungskriterien an sich erfüllt sind.

Darüber hinaus ist die vorliegende Studie mit weniger Problemen konfrontiert als vorherige Beschreibungen der CIR, in denen sie als rein phonologischer Prozess aufgefasst wird. Sie besitzt das Potenzial zur Verallgemeinerung, indem sie die in der Grammatik bereits vorhandenen Strukturen für die Erklärung der Reduplikation hoher Vokale auswertet.

SUBJECT INDEX

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