NDAU MINIMALITY EFFECTS

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Abstract

This study is an investigation of minimality effects in Ndau. It proffers an account of repair strategies that are used by Ndau speakers whenever they meet sub-minimal words. The data for this study were collected through intuition and verified by other Ndau speakers in Chipinge and Chimanimani districts of Manicaland Province in Zimbabwe. The research situates Morpheme Based Theory within Optimality Theory (Downing, 2006) to examine the different strategies employed in Ndau to ensure that the prosodic word is minimally disyllabic. We established that Ndau speakers use vowel epenthesis in both verbal and nominal constructions as well as cliticisation to ensure that Ndau words meet the required size of Ndau words which is disyllabic. This claim is recast within Optimality Theory (OT), which shows that the minimal word condition in Ndau straightforwardly stems from the ranking of relevant constraints in the language. The major contribution of this study is typological as it adds to the languages that utilise repair strategies to deal with words that are potentially sub-minimal.

Keywords: Ndau, minimality, epenthesis, cliticisation, sub-minimal.

1. Introduction

Ndau is an inter-territorial speech variety that straddles the artificial international boundary of Mozambique and Zimbabwe (Macgonacle, 2007, p. 6). Approximately 800 000 speakers of Ndau in the Manicaland and Masvingo province identify Ndau as their mother tongue in Zimbabwe. Approximately 702 455 speakers of Danda and Shanga in the Manica and Sofala provinces of Mozambique use Ndau as their first language (Central Statistical Office ,2002; Mutonga, 2017; Sithole 2017). In both countries, Ndau has mutually intelligible varieties, customs and traditions, and cultural practices that are regrettably exaggerated by the existing international boundary. The political boundary has also amplified the linguistic separation of Zimbabwean Ndau and Mozambican Ndau as the language was subjected to different language planning processes, which culminated in it being classified as a language in Mozambique and a dialect in Zimbabwe. Ndau was made a dialect of Shona for eighty-two years in Zimbabwe but was ameliorated into a separate, officially recognised language in 2013 (Constitution of Zimbabwe Amendment (N0.20) Act 2013 (page 17). In Mozambique, Ndau has been recognized consistently as a national language without any meaningful formal responsibilities. Ndau is an underdescribed and marginalised language in both countries. The extent of its underdevelopment is demonstrated by an apparent paucity of meaningful studies and literature across its linguistic, historical and cultural aspects. Such a void is not consistent with its official and "officially recognised" language[2] status in Zimbabwe as it is expected

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2. In view of the Constitution of Zimbabwe, Ndau is presented as one of the 16 officially recognised languages of Zimbabwe. However, the term 'officially recognised' language remains not only elusive but hotly contested

to function in high-status and controlling domains of language such as education, media, science and technology, politics and economy.

This research seeks to investigate and provide a formal analysis of the minimality effects in Ndau. Contrary to Mudzingwa (2008; 2010), this study argues that there are different minimality requirements for different morpho-phonological constituents in Ndau. It examines various morpho-phonological domains in which monosyllabic stems are apparently not tolerated and describes the strategies that are used in Ndau to fulfil the minimality requirements. In order to have a detailed analysis of word minimality, this research uses insights from Morpheme Based Theory (Downing, 2006) within Optimality Theory (OT) to explicate the phonological and morphological strategies that are used in Ndau to maintain word minimality. Even though studies on minimality were done in Zezuru and Karanga (Mudzingwa 2008; 2010), this present study argues that minimality effects in Ndau operate in clearly defined morpho-phonological and morpho-syntactic domains. Therefore, the contribution of this research is four-fold; first, it presents fresh data on word minimality from Ndau and second, it is typological as it adds to a list of languages that utilize repair strategies to eliminate subminimal words. Thirdly, this helps bring together not only the word minimality repair strategies but also to show that the phonology, morphology and morpho-syntax of Ndau and other Bantu languages, are inextricably linked (cf. Myers, 1990). Fourthly, it is an original formal analysis of word minimality in Ndau that has not been described in previous work in this language. The overall significance of this study is based on the fact that it is the first study to offer a comprehensive analysis of word minimality in Ndau.

Studies on word minimality across languages have shown that some languages disallow (content) words that consist of just one light (i.e. CV/CVC) syllable. Hayes (1995, p. 88) lists forty languages that display this "minimal word syndrome". The cited evidence for the syndrome includes cases where a truncation process is blocked to avoid creating words that are too short and also in cases where the size of a CV/CVC input is increased by a phonological process of word augmentation. Since the languages that enforce the minimal word syndrome are from a number of very different families, it is reasonable to infer that this condition is a design feature of language. Nevertheless, a comprehensive explanation of the phenomenon has not yet been provided; we do not yet have a theory of minimality that accounts for the various manifestations of the phenomenon. The most widely accepted analysis follows McCarthy and Prince (1999) and postulates that the minimal word emerges from constraint interaction that requires a (prosodic) word to contain at least one foot and disallows the possibility of degenerate (i.e. non-binary) feet (FOOT BINARITY (FTBIN). Since satisfaction of the latter constraint may hold at either the syllabic or moraic level, the smallest word would be disyllabic or bimoraic, depending on the language.

Words in Bantu languages have been shown to be minimally disyllabic (Brandon, 1975; Myers, 1987; Batibo and Rottland, 1992; Downing, 1999; 2001; Mudzingwa, 2010; Mutonga, 2017; Kadenge and Mathangwane, 2017), that is, they

as language scholars believe that it does not translate into an official language while legal experts insist that it carries the same weight as an official language (Kadenge and Mugari, 2015; Mutonga, 2017; Sithole, 2017).

have to consist of at least two syllables. Such a constraint on size has been referred to as "minimality restriction", "minimality requirement", or "minimality condition" (Zerbian, 2012, p. 24). The minimality requirement in Bantu languages such as Zulu has initially been phonologically motivated (cf. Batibo and Rottland, 1992; Downing, 1999; 2001; Myers, 1987).The argument is that a (phonological) word consists of at least one stress foot and a stress foot must contain at least two syllables or morae. The minimality condition projects upwards from smaller to bigger prosodic constituents, as defined by the Prosodic Hierarchy (Nespor and Vogel, 1986). Thus, if a foot has to be minimally disyllabic, then the phonological word has to be minimally disyllabic as well. However, there are several problems with this approach, as Downing (2006) has discussed in detail. One of the points of criticism is first the status of stress (and thus of a foot whose definition is based on stress) in the Bantu tone languages. Being tone languages, stress can at most be assumed on the phrasal level. The second point of criticism is the prediction that arises from it: if minimality is related to feet then this predicts that stress languages (which have feet) show a tendency to have monosyllables. Downing (2001) argues that depending on the language, there exist differing minimality requirements for different morpho-phonological constituents ("ungeneralizable minimality"). For example, there can be a minimality requirement for the Macrostem[3], or for the reduplicants because the inflected (lNFL) - component can take different morpho-phonological constituents as its complement depending on the verbal construction, and because only some stems have minimality restrictions. However, there is a need to amend Downing's (2001) analysis. Downing states that the inflected stem should be at least disyllabic as it consists of at least two morphemes, namely the root and the inflectional final suffix (IFS). However, it needs to be noted that this argument makes an obvious wrong prediction for the Principal Present Tense, which consists of a subject marker and the stem.

Zerbian (2012) looks at word minimality in Tswana, a member of the Sotho-Tswana languages spoken in Lesotho, Botswana, South Africa and Zimbabwe. Tswana, like other Bantu languages shows, a limited number of monosyllabic stems. These stems trigger particular segmental rules if they occur in imperative, positive participial tense, reduplication, passive, nouns in class 9 and adjectives in class 9. What is interesting in Tswana is that the segmental material is inserted or retained in connection with monosyllabic stems in a number of unrelated morphological contexts. In the nominal domain, noun class prefixes are retained whereas in the verbal domain, additional vowels are inserted thereby often doubling the quality of the respective subject concord marker.

Minimality in Zezuru has attracted the attention of scholars such as Doke (1931); Myers (1987); Mudzingwa (2008; 2010); Downing and Kadenge (2015). These scholars observe that the Minimal Word in Zezuru is disyllabic. This present research argues that morphological minimality conditions are better explained through the correlation between morphological and phonological complexity that follows from Head-Dependent Asymmetries (Downing 2006) pervasive in phonological systems.

3. In Bantu, the macrostem is the portion of the verb complex that begins with the object marker (if present) and extends rightward to the end of the verb complex.

2. Methodology

The primary source of data in this research is intuition since one of the researchers is a native speaker of Ndau. Intuition is the data gathering method that is used widely in generative grammar studies (Haegeman, 1991). This introspective approach where a writer, as in the present case uses oneself as an informant in the accumulation of data is what Newmeyer (1986) commented upon as follows "the typical practice of generativists has been to use themselves as informants in collecting data about the acceptability and interpretation of grammatical constructions (p.23)." The linguistic competence of one of the researchers is a language ability that he shares with other speakers of the Ndau language. It cannot be expected that the researcher's introspective judgments on Ndau constructions will always be accurate. With this view in mind, the researchers, where they deemed necessary, therefore checked on the grammaticality and/or acceptability of utterances against the collective linguistic and/or grammatical competence of other native speakers of Ndau in Chipinge and Chimanimani Districts. The data gathered was recorded in audio form and transcribed. The researchers also collected some data from Ndau written materials such as Mkanganwi (1973) and Mutonga (2017).

3. Theoretical framework

The researcher situates Morpheme Based Theory within OT (Downing 2006) to examine the different strategies employed in Ndau to ensure that the prosodic word is minimally disyllabic. This theory is inspired by the Prosodic Hierarchy Theory developed by Selkirk (1993), Inkelas (1989) and McCarthy and Prince (1986). Downing (2006) argues that Prosodic Hierarchy is not the best theory to use for analyzing minimality. She developed an alternative approach within the Optimality Theory framework; the Morpheme-Based Template Theory (MBT). Her approach shares with the Prosodic Hierarchy based theory, the observation that prosodic morphemes have a restricted repertoire of prosodic shapes since they draw on the canonical shapes of a restricted repertoire of morphological shapes. However, she demonstrates that the Prosodic Hierarchy theory runs into problems in its attempt to account for minimality cross-linguistically. The major problem she raises with the Prosodic Hierarchy theory is that the theory reduces word minimality to stress foot minimality by the principle of HEADEDNESS: the prosodic word dominates stress foot in the Prosodic Hierarchy. Downing (2006, p. 94) points out that;

> This predicts that we should find a strong correlation between minimal word size and the independently motivated minimal stress foot of the language. As proper stress Feet are minimally bimoraic or disyllabic by BINARITY…, we expect words to also have this minimum size.

Although there are languages which bear out this prediction, Downing (2006) concludes that these languages are not representative. Downing (2006, p. 99) concludes that the problem with the Prosodic Hierarchy-based theory of word minimality is that if minimality falls out automatically from stress footing, the expectation would be that languages without word stress should not have a minimality requirement - yet they do. What is novel about the MBT is that the motivation for canonical shape is independent of Prosodic Hierarchy. The approach argues that canonical morpheme shape follows from a correlation between morphological complexity and

phonological complexity. Lexical morphemes meet minimality requirements not because they contain a stress foot, but rather because they are heads and licence complex phonological structures.

4. Data presentation and analysis

Languages exhibit constraints on the size of prosodic words, and these constraints require lexical categories to be able to meet certain minimal length requirements in the sense that words should be either bimoraic or disyllabic, depending on the prosodic typology of the language. This study, in the spirit of accounting for repair strategies in Ndau, observes that the minimal prosodic word in this language is disyllabic. We demonstrate that the minimal word in Ndau triggers processes which expand potentially sub-minimal words and blocks processes which threaten to reduce a word to sub-minimal. The processes that repair sub-minimal words in Ndau are augmentative epenthesis and cliticisation.

Ndau prosodic words are governed by principles of prosodic well-formedness. To be well-formed, a prosodic word must be at least one foot in length, and for a foot to be well-formed, it must be binary (see, McCarthy and Prince, 1990; 1993; Mester, 1994). This study utilises the following constraints to account for strategies that are utilised to maintain the minimal word in Ndau. The branching principle motivating binary minimality is formalised by the following markedness constraints:

(1) HEADS BRANCH:
Lexical Heads (Roots) must prosodically branch.
(Downing, 2006, p.122-123; Dresher and van der Hulst, 1998, p. 320)

(2) *V:
Long vowels are marked (Rosenthal, 1994, p. 147)

(3) CLITIC-SYLLABLE-CORRELATION:
Each clitic contains exactly one monomoraic syllable (Downing, 2006, p. 122-123)

(4) DEP IO: Every element of S_2 has a correspondence in S_1. (McCarthy and Prince, 1995, p. 264)

(5) CLITICIZATION:
Every morphological word in the input has a correspondence in the output.
(Mudzingwa, 2008, p. 52)

These constraints are considered to be independently motivated because they are supposed to be active, cross-linguistically, in the description of phenomena other than the minimal word. We assert that the minimal word is "emergent as the most harmonic possible prosodic word", as defined by this set.

4.1 Augmentative epenthesis

Augmentative epenthesis is the basic and less controversial strategy to prevent monosyllabic morphemes from becoming monosyllabic words. Augmentative epenthesis involves the prefixing of a vowel to a monosyllabic morpheme. Vowel epenthesis occurs in nouns and verbs. The motivation for vowel epenthesis is to maintain the prosodic requirement of the Ndau word which is disyllabic. Augmentative epenthesis in both nouns and verbs shows that there is a close connection between initial onsetless syllables and word minimality in Ndau.

4.2 Nouns

Ndau augments[4] monosyllabic nominal words through the [i] epenthesis. The coronal vowel /i/ is argued to be the least marked vowel in most Bantu languages (cf. Kadenge and Mathangwane, 2017; Myers, 1987; Uffiman, 2004). In Ndau, disyllabic nouns have the same form with or without the prefix, but monosyllabic words have different forms when they are bare and when they have a prefix. Consider the following examples:

[1]	(a)	/ fé /	[ìfé]	cf. [ʧìfé]
		CL.5- sugarcane		
		'Sugarcane'		
	(b)	/$^{m}b^{w}$à/	[ì$^{m}b^{w}$à]	cf. [ʧì$^{m}b^{w}$à]
		CL.9-dog		
		Dog'		
	(c)	/dĕdĕ/	[dĕdĕ]	cf. [ʧì dĕdĕ]
		CL.5-baboon		
		'Baboon'		

In [1a] and [1b], the Minimal Nominal Stem (CV) and a noun class prefix are joined to form an Inflected Nominal Stem which is a prosodic stem that is co-extensive with the prosodic word. They surface as VCV, with an initial [i]. However, when the overt class prefix is added to a word which is augmented with [i], it becomes an ill-formed structure in Ndau. Epenthesis [i] must not appear when the monosyllabic stem is attached to a class prefix, as shown below:

[2]	(a)	/t^{w}ù- fé/ 'small sugarcane'	[t^{w}ùfé]	*[t^{w}ùjífé]
	(b)	/tù- $^{m}b^{w}$à/'small dogs'	[tù$^{m}b^{w}$à]	*[tùjí$^{m}b^{w}$à]

The absence of [i] when the class prefix is added to a monosyllabic stem and the fact that hiatus cannot be resolved show that its presence is to satisfy the possible prosodic structure which requires a word to have disyllabic minimality. Its absence is not due to the deletion but to the fact that it cannot be present when the class prefix is added to monosyllabic stems. In fact, [i] does not carry any meaning or grammatical function and only has a phonological function to satisfy the disyllabic minimality required by the prosodic word. Furthermore, nouns that begin with the vowel */i/* have different forms. If there is a prefix, they do not have the vowel /*i*/, but when they are in isolation, they begin with this vowel. The fact that the vowel only surfaces when the monosyllabic forms are in isolation suggests that it is epenthesised as shown in the following examples:

[3]	Noun phrase	bare noun		
(a)	/sé-fé/	* [sé-**ì**fé]	[**ì**fé]	*[fé]
	ADV AFF-sugar cane	'Like a sugar cane'		
	'Like a sugar cane'			
(b)	/sé-mbá/	* [sé-**ì**mbá]	[**ì**mbá]	*[mbá]
	ADV AFF-house	'Like a house'		

4. This refers to the insertion of the 'initial vowel' in a monosyllabic word.

	‘Like a house’			
(c)	/sé-mbwá/	*[sé-**ì**mbwá]	[**ì**mbwá]	*[mbwá]
	ADV AFF-dog			
	‘Like a dog’	‘Like a dog’		

From the above examples, attempting to add the vowel */i/*, when the noun has a prefix is ungrammatical. However, in the forms in which there is an underlying vowel, trying to remove the vowel when there is a prefix results in ungrammatical forms as well. Evidence which shows the disyllabic structure of Ndau words comes from loanword phonology. Consider the following example;

[4]	Received Pronunciation	Ndau Pronunciation	
(a)	/te^{m}pl̩/	[té^{m}bér**í**]	‘temple’
(b)	/ten/	[tén**í**]	‘ten’
(c)	/tʌn/	[tàn**í**]	‘tonne’
(d)	/spu:n/	[s**ì**pún**ú**]	‘spoon’
(e)	/kla:s/	[k**ì**lás**í**]	‘class’

An interesting observation emanating from the data given above is that monosyllabic English words such as /ten./ ‘ten’ and /kla:s./ ‘class’ become disyllabic when borrowed into Ndau due to the word final vowel epenthesis. This leads to their being realised as [té.ní] and [kì.lá.sí.] respectively. This process enhances the satisfaction of the Ndau disyllabic word requirement which demands that all Ndau words should have at least two syllables (see, Doke, 1931; Fortune, 1955; Kadenge, 2008; Kadenge and Mabugu, 2009). Therefore, the research concludes that vowel epenthesis is mainly a phonotactic and prosodic process. This observation is based on the fact that vowel epenthesis helps in achieving the preferred Ndau CV syllable structure and the minimal disyllabic word requirement.

The other piece of evidence in support of the [ì] epenthesis hypothesis comes from plural formations. Consider the following example:

[5]	Singular	Plural	
(a)	[ìgó]	[màgó]	*[màj**ì**gó]
	CL.5- wasp	CL.6-wasp	
	‘Wasp’	‘Wasps’	
a.	[ìfé]	[màfé]	*[màj**ì**fé]
	CL.5-sugarcane	CL.6-sugarcane	
	‘Sugarcane’	‘Sugarcanes’	

From the above example, it is evident that the nominal words in class 5a are pluralized by prefixing /mà-/ (cl.6) which has a CV noun class prefix, when the CV prefix is attached to the monosyllabic stems, the surface forms do not have the vowel [i]. It can be argued that the lack of [i] epenthesis in the monosyllabic [5 a and b] is because the CV noun class prefix and the CV stem constitute a well-formed prosodic word, thereby making [i] epenthesis redundant. However, in cases where the noun class prefix /mà-/ is added, it can be argued that the vowel [i] is deleted to

avoid hiatus. The occurrence of initial onsetless syllables is motivated to maintain disyllabic word minimality in Ndau. The tableau below is an OT analysis of vowel epenthesis in nouns.

Table 1: Vowel epenthesis in nouns

/ fé /'sugar cane'	Heads Branch	Prosodic Branching	*V:	Dep IO
(a) [fé:]	*!		*!	*
(b) →[ì.fé]				*
(c) [ì.fé:]			*!	*
((d) [fé]	*!	*		

Candidate (a) is not an optimal candidate because it violates two highest-ranked constraints heads branching and it further violates the constraint *V: Candidate (b) is the optimal candidate because it violates the least-ranked constraint DEP IO. Candidate (c) in which both epenthesis and lengthening of vowel violates the high ranked constraint *V: and the least ranked constraint DEP IO. Candidate (d) is eliminated because it violates the high-ranked constraint HEADS BRANCH.

4.3 Verbs

Augmentative epenthesis is also evident in verbs. Monosyllabic verbs have different forms, when in the infinitive and imperatives. The imperative is the only context where verb stems may occur unprefixed in most Bantu languages (Downing, 2006). This is echoed by Downing and Kadenge (2015) who note that the imperative provides a productive context to illustrate this as it consists of the verb stem and most Bantu languages have a few sub-minimal C- a stems. As such they are very interesting for considerations of minimality (Zerbian, 2012). Ndau follows this general pattern: the imperative form of most verbs consists of the bare verb stem and the monosyllabic stems are augmented by epenthesizing (semantically empty) a syllable in the imperative.

[6]	Infinitives	Imperatives	
(a)	/kù-r^{j}-á /	[í.r^{j}á]	*[r^{j} a]
	INFV-eat-FV	'eat'	
	'To eat'		
(b)	/kù-ɗ-á/	[í. ɗă]	*[ɗă]
	INFV-love-FV		
	'To love'	'love'	
(c)	/kù-é^{m}b- á/	[é . ^{m}bá]	*[^{m}bá]
	INFV-sing-FV		
	'To sing'	'sing'	
(d)	/ kù-át-á/	[á.tá]	*[tá]
	INFV-sleep-FV		
	'to sleep'	'sleep'	
(e)	/kù-óm-á/	[ó. má]	*[má]
	INFV-dry-FV		

	‘to dry’	‘dry’	
(f)	/kù-p-á/	[í. pá]	*[pá]
	INFV-take-FV		
	‘To give’	‘give’	
(g)	/ kù-f-á/	[í. fá]	*[fá]
	INFV-die-FV		
	‘To die’	‘die’	
(h)	/kù-í -s-á/	[í.sá]	*[sa]
	‘INFV-put-FV		
	‘To put’	‘put’	
(i)	/ kù-m^{w}-á/	[í. m^{w}á]	*[m^{w}á]
	INFV-drink-FV		
	‘To drink’	‘drink’	
(j)	/ kù-ón-á/	[ó. ná]	*[ná]
	INFV-see-FV		
	‘To see’	‘see’	

The above data illustrate that the verb roots made up of a single consonant which combines with the final vowel /a/ and surfaces as a monosyllable when in the imperative form, have different forms when in the infinitive and the imperative. There is no need for /i/ epenthesis in the infinitive because the infinitive /ku-/ (CV) and the monosyllabic stem (CV) constitute a well-formed Prosodic Word (CV.CV). In other words, the epenthesis of the coronal vowel /i/ would be redundant because there is no sub-minimality to repair. The best motivation for syllable epenthesis in the imperative form of monosyllabic stems is that, as argued by Myers (1987), prosodic words are cross-linguistically required to be minimally disyllabic. Vowel epenthesis in the imperative shows that Ndau has a minimality restriction on the verb word. Hence, the epenthesis of the vowel /i/ and /a/ in imperatives shows that Ndau imposes a disyllabic minimality requirement.

4.4 Reduplication with monosyllabic verb stems

Reduplication of verbs is a highly productive word formation process in Ndau in order to express repeated or continuous action. Across Bantu languages, reduplicants often show a minimality requirement in having to be minimally disyllabic. In Ndau, a vowel is inserted in the reduplicants but only with monosyllabic verb stems. This is shown in the following example;

[7]	(a)	/ -fá/	[-fàá-fá]
		‘suffer’	‘suffering continuously’
	(b)	/-r^{j}á /	[-r^{j}àá-r^{j}á]
		‘eat’	‘eat continuously or indiscriminately’
	(c)	/-mwá/	[-m^{w}àá-m^{w}á/]
		‘drink’	‘drink continuously or indiscriminately’
	(d)	/-wá /	[-wàá-wá]
		‘fall’	‘fall about frequently’

The vowel is inserted in order to satisfy minimality requirements when the underlying segmental content is insufficient. The epenthesized vowel is semantically

empty but it is used to satisfy the minimal word in Ndau which is disyllabic. Two adjacent identical vowels are considered as constituting two separate syllables because Ndau does not have a phonemic vowel length contrast. Again, the fact that the two adjacent vowels can carry different tones is taken as evidence for their syllabicity. The insertion of an additional vowel lends itself to an analysis within the framework that posits minimality restrictions on the size of morpho-phonological constituents. The reduplicant (=REDStem) needs to be minimally disyllabic in Ndau (as in many other Bantu languages). Minimality in reduplication constitutes an example for the need of minimality defined over constituent size.

4.5 Passive formation with monosyllabic verb stems

Passive formation is another highly productive process in Ndau in which the passive morpheme is added as a suffix to the verb root, thereby constituting the derivational stem. Passive formation in Ndau is evidence used in support of the [ì] epenthesis hypothesis. Monosyllabic verb stems in Ndau take the passive suffix /-iw-/ instead of the /-w- / used with disyllabic verbs only (cf. Cole 1955, p. 195; Kotze and Zerbian 2008). The obligatory use of /-iw-/ with monosyllabic stems is attributed to minimality requirements according to which the inflected stem (root+extension+IFS) must be minimally disyllabic (Downing, 2001, p. 49). Consider the following example:

[8]		Verb	Passive	
	(a)	/ɓá t-á/ hold-FV 'Hold'	[ɓá t-**w**-á] hold-PASS-FV 'Held by'	
	(b)	/ɓék-á/ put-FV 'Put'	[ɓék-**w** á] put -PASS-FV 'Put by'	
	(c)	/p-á / give-FV 'Give'	[p- **íw**-á] give-PASS-FV 'Given by'	*[p**w**-á]
	(d)	/ɓ- á/ steal-FV Steal	[ɓ-**íw**-á] steal-PASS-FV 'Stolen by'	*[ɓ-**w**-á]
	(e)	/róʋ- á/ beat –FV 'Beaten'	[róʋ^{w}-á] beat-PASS-FV 'Beaten by'	

From the above data, the morpheme /–w-/ is used with disyllabic verbs and /–íw-/ is used with monosyllabic verbs. This means that in monosyllabic verbs, the use of the passive morpheme /-w-/ would result in monosyllabic words. The epenthesis of /i/ provides an extra nucleus for a much needed extra syllable and thereby enables the word to satisfy minimal word requirements. An insightful account of the /-íw-/ and /-w-/ is to consider the use of /-íw-/ as involving vowel epenthesis: The passive morpheme is /–w-/ and /i/ is epenthesized when it is needed either for augmentation or to satisfy the phonotactics of Ndau. This sounds logical considering that the vowel /i/ is the epenthetic vowel in Ndau. The following tableau is an analysis of epenthesis in verbs.

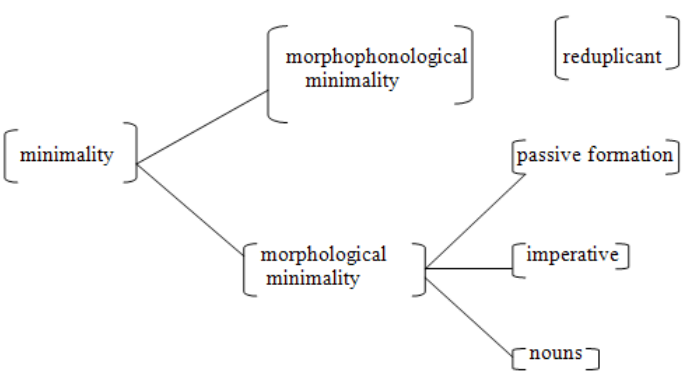
Table 2: Vowel epenthesis in verbs

/ rʲà/ 'eat'	Heads Branch	Prosodic branching	*V:	Dep IO
(a) [rʲà]	*!	*		
(b) →[í.rʲà]				*
(c) [rʲà:]	*!		*	*
(d) [í.rʲà:]			*!	

The first candidate is disqualified because it violates the two highest-ranked constraints. The second candidate is the optimal candidate because it violates the least marked constraint DEP -IO, through epenthesis of /i/ is meant to satisfy the higher ranked constraint HEADS BRANCH. Although in hiatus contexts, DEP (Place) is not violated, since place features were spread from a neighbouring vowel, in prosodic minimality contexts, particularly in Ndau, the constraint DEP (Place) is always violated. There is no way Ndau can supply the much-needed second syllable without the insertion of a vowel. The third candidate is eliminated because it violates the highly ranked constraint HEADS BRANCH which requires every head to branch and has at least two syllables rather than two morae. The fourth candidate violates the constraint *V: and also violates the constraint DEP -IO since there is epenthesis of a vowel and of a mora through lengthening.

The above-mentioned process of vowel epenthesis is triggered by monosyllabic stems. The discussion of the Ndau data have shown that augmentative vowel epenthesis as a repair strategy to achieve the disyllabic word minimality can insightfully be accounted for by adopting the phonological, morpho-phonological as well as morphological approaches to word minimality. All these approaches are necessary in a language in order to account for the array of phenomena observed in Ndau. The figure below presents an overview of those morpho-phonological contexts which show sensitivity towards minimality considerations in Ndau.

Figure 1: Vowel epenthesis as a word minimality strategy in Ndau



4.6 Cliticisation

There are disyllabic words that are free forms, that is, they stand on their own. However, none of these words can stand on their own when reduced to a single syllable. Consider the examples below;

[9] (a) /vàná à-vá/ [vànává] *[vàná vá] *[vànáàvá]
CL.2-child STAB-DEMON AFF- these-FV
'These children'

(b) /tʃàj-á ì-n-í/ [tʃàjéní] *[tʃàjé ní] * [tʃàjéìní]
beat-FV STAB-1PS.SG-FV beat me
'Beat me'

The above examples show the fact that the disyllabic words function as clitics when they are reduced to monosyllabic words. Clitics may be regarded as monosyllabic because they cannot stand on their own so that any attempt to have them stand on their own results in ungrammaticality. In the pronoun, ì*mí, 'you'* and the demonstrative *à-vá,* **'**these', when the vowel in each of these forms is elided, it means these function words cannot stand on their own and they are cliticised. However, cliticisation and the retaining of the initial vowels of these function words is unacceptable;* *vànáàvá*. In the word *tʃàj-á ì-n-í 'beat me'* the final vowel of the first word and that of the second word are coalesced and it is realized as *tʃàjéní* 'beat me' after cliticisation. This is also supported by Simango and Kadenge (2014:84) when they note that "…When the demonstrative cliticises to the noun or verb, what cliticises is not the entire VCV structure (i.e. augment plus stem) but the CV. In other words, only the stem of the demonstrative participates in cliticisation." The evidence to show that these are two words forming a single word comes from the fact that Meeussen's rule[5] applies in the forms: The high of *ní* 'me' is lowered by the preceding high of *tʃáj-á* 'beat' when the word is realized as *tʃájéní* 'beat me' as opposed to *tʃáj-é* ìní 'beat me.' An attempt to have coalescence and retaining the vowel /i/ is unacceptable **tʃájéìní*. In example (b) the deleted vowel is just epenthesised vowel which they consider not to be a grammatical entity except to give monosyllabic words a disyllabic status. From this point of view, the deletion of the stabilising vowel is a means of getting rid of redundant element whose stabilising function role has been lost as the demonstrative is cliticised to the preceding word.

According to Mkanganwi (1995, p. 166), "monosyllabic constructions have another syllable added in the form of a stabilising vowel /i-/ which we cannot call a morpheme (…) it has no meaning and no grammatical function." The argument that is then posited is that the initial vowels of the demonstrative and absolute pronouns are not there in the deep structure or the underlying representation. As shown earlier in Ndau and other languages that insert the epenthesised vowel do so to maintain the Ndau minimal word which is disyllabic. In line with this view, in example 9 (a) and (b) epenthesised vowels are shown to be the target of deletion as they do not have any grammatical function besides that of stabilizing monosyllabic

5. The Meeussen's rule refers to the deletion of the high tone when it is followed by another high tone such that it becomes low tone

pronouns and demonstratives. It then means that the epenthesised vowel is not part of the underlying representation of the demonstrative and the absolute pronoun. In both cases, the demonstratives and pronouns are cliticised to a noun and a verb, respectively. The following tableau is an analysis of cliticisation.

Table 3: Cliticisation

/tʃájé{iní}/ 'beat me'	Heads Branch	Prosodic Branching	*V:	Clitic-Syllable Correlation	DEP Dep IO	Cliticisation
(a) [{tʃájé}{ní}]	*!	*				
(b) [tʃá.jé}{ní}]	*!	*	*			
(c) →[{tʃá.jé.ní}]						*
(d) [{tʃà.já.ì.ní}]				*!	*	*
(e) [{tʃá.jé.ní:}]			*!	*	*	*

Candidate (a) violates the high-ranked constraint HEADS BRANCH. The second candidate (b) violates the high-ranked constraint HEADS BRANCH since the word has two morae rather than two syllables as is the requirement in Ndau. Candidate (c) is the optimal candidate; it violates the least ranked constraint CLITICISATION. Candidate (d) in which the second vowel /*i*/ is epenthesised violates the high-ranked constraint CLITIC-SYLLABLE-CORRELATION. Cliticising the word *ìní* 'me' violates this constraint since the cliticised word is larger than a syllable. Candidate (e) violates the constraint *V: since the second word has a long vowel. Further, cliticisation of this word violates the constraint CLITIC-SYLLABLE-CORRELATION since the clitic is a bimoraic syllable.

5. Conclusion

In this research, the researchers used the morphology-based approach to minimality to explain augmentative epenthesis and cliticisation as strategies that enforce word minimality in Ndau. All lexical Ndau words are subject to minimality conditions because of the HEADS BRANCH requirement. Word minimality in Ndau is governed by the following constraint ranking:

(6) HEADS BRANCH, PROSODIC BRANCHING, *V: CLITIC SYLLABLE-CORRELATION>> DEP IO, CLITICISATION

The study argues that augmentative epenthesis and cliticisation processes are triggered to expand potentially sub-minimal words.

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