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/mu/ Reduction and NC Syllabification in siSwati: An Optimality Theory Analysis

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Abstract

Purpose: This paper examines the different realisations of Nasal Consonant sequences (NCs) and their syllabification across various morphosyntactic domains in siSwati.

Methodology: The study utilises data collected from descriptive and theoretical studies on siSwati linguistics, relying on native speaker intuition and knowledge of the language for verification. It employs Optimality Theory (OT) to account for the intralinguistic variation in the representation of NCs in siSwati. Within this framework, OT provides a principled account of how phonological constraints interact with morphological structure to yield the observed patterns of NC syllabification in siSwati.

Findings: Findings indicate that the syllabification of NC sequences is predictable, with /mu/ truncated forms parsing a syllabic segment; otherwise, siSwati maintains homorganicity between the nasal and the following consonant in various derived and non-derived contexts.

Unique Contribution to Theory, Practice and Policy: Previous research on NC syllabification in siSwati presupposes the existence of codas emanating from /mu/ truncation. These studies also focused on /mu/ reduction in siSwati alongside other Bantu languages, mapping the degree of similarity and dissimilarities in NC syllabification patterns in the languages under investigation. The current study provides an in-depth investigation of the morphosyntactic and phonological contexts in which /mu/ truncation occurs. The study argues that NC representation is determined by the interaction between phonology and morphology within the grammar. The analysis considers two phonological contexts: a) NCs derived from /mu/ truncation, and b) those in non-derived environments.

Keywords: *NC Syllabification, mu-Reduction, Siswati Syllable Structure, Intralinguistic Variation, Linguistic Typology*

INTRODUCTION

A characteristic feature that is common in Bantu languages, and other languages crosslinguistically, is nasal place assimilation where nasals assimilate to the place of articulation of an adjacent consonant, usually the one it precedes. This has been a subject for many debates especially in how Nasal and Consonant sequences (NCs) are syllabified crosslinguistically, with a manifold representation where output NCs can be realised as clusters (NC), codas (VN.C), syllabic nasals preceding a homorganic consonant (N̩.C), or prenasalised segments (^{N}C) (Hubbard, 1995; Cahill, 1998, Kula, 2002; Beddor & Onsuwan, 2003; Sibanda, 2004, 2009; Downing, 2005; Malambe, 2006; Morrison, 2009; Harford & Malambe, 2011; Kadenge, 2015; Harford & Malambe, 2015). Since languages have phonological requirements on preferred syllable structures, the precepts of individual grammars dictate how NCs are syllabified depending on permissible syllable structures across the various languages of the world.

In some Bantu languages, NC sequences are syllabified as prenasalised, unitary segments. Tucker-Childs (2003, p. 32) posits prenasalisation as a unique phonological process where the "nasal cavity remains open until midway into the production of the stop, thus producing a short nasal stop before the oral stop itself". Beddor and Ansuwan (2003) differentiate iKalanga ^{N}Cs from canonical nasals in that the former has a post-nasal closure in its articulation, and can only appear word medially. For instance, Batibo (2002), Mwita (2009) as well as Downing and Mtenje (2017) treat NCs and consonant + glide sequences (CGs) as clusters rather than unitary segments. In a language that allows complex codas such as English, a complex NC structure is optimal because the N is syllabified as a coda of the preceding syllable, and the C as an onset of the following syllable, except word finally where both consonants are syllabified as branching codas, respectively.

Some Bantuists adopt positional distribution, where syllabification of the nasal depends on the morphological environment in which it appears. Cahill (1998) argues that the manifestation of NCs in Konni, a language spoken in Ghana, is conditioned by the specific environment in which they appear – whether word initially or word medially. He first argues that NCs in Konni are always homorganic and syllabic if they appear word initially, but unitary segments word medially as seen in the examples below (Cahill, 1998, p. 127):

(1) **m̩**.bali-já 'I have told'

(2) **n̩**.dogi.já 'I have carried'

(3) **ŋ̩**.kali-já 'I have sat'

(4) tí**^{ŋ}**gbáŋ 'floor'

(5) bi**^{ŋ}**kpìán 'shoulder'

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Similarly, Tak (2011) presents a comparative study of phonologically and morphologically conditioned NCs, with varying degrees of representation from language to language. He notes that there is a relatively high propensity for phonologically derived NCs to be realised as prenasalised segments while morphologically determined ones are typologically realised as a syllabic nasal followed by a homorganic consonant. Consider the following Luganda examples (Tak, 2011, p. 133):

(6) /mu-ntu/ → [mu.$^{\mathbf{n}}$**t**u] *[mu.**n̩**.tu]
CL1-person
'person'

(7) /N-kuba/ → [**n̩**.ku.ba] *[$^{\mathbf{ŋ}}$**k**u.ba]
CL9-rain
'rain'

As evident in the above examples, word-medial syllabicity (6) and word-initial prenasalisation (7) would be considered ill-formed in the Luganda grammar.

One representation of the treatment of NCs in Bantu languages is evident in /mu/ reduction, a phonological phenomenon attested and analysed in various Bantu languages (See Poulos & Msimang, 1998; Morrison, 2009; Harford and Malambe, 2015; Kadenge, 2014; Kadenge, 2015; Odden, 2015; Kadenge & Chebanne, 2017; Downing & Mtenje, 2017; Persohn, 2019, amongst others). In these languages, the Class 1 and 3 prefix is obligatorily reduced in polysyllabic nominal and verbal stems but sometimes retained before monosyllabic ones, to account for minimality restrictions on the Prosodic Word (PWord). Typological research on /mu/ truncation and the subsequent syllabification of output NCs in Bantu has argued for the representation of the resultant nasal as a) a complex prenasalised segment where the nasal shares the same place features with the following consonant, b) a syllabic, assimilatory, and moraic segment c) a syllabic, assimilatory but non-moraic segment, and d) a syllabic, non-assimilatory, and non-moraic segments (see Khumalo, 1985; Kadenge, 2015; Odden, 2015; Kadenge, 2015; Kadenge & Chebanne, 2017; Persohn, 2019). These degrees of variation across Bantu languages follow on the dictates of individual grammars, which may either mirror or be dissimilar to how each language syllabifies non-derived sequences in the grammar. We illustrate this crosslinguistic variation below:

(8) ChiNambya: /u-mu-bali/ → [u.mba.li] (Kadenge, 2015, p. 100)
AUG-CL1-secretary
'secretary'

(9) IKalanga: /mù-lúmè/ → [ǹ̩.lú.mè] (Kadenge&Chebanne, 2017, p.183)
CL1-man
'man'

(10) Nyakyusa: /ʊ-mu-kino/ → [ʊ.ŋ̩.ki.no] (Persohn, 2019, p. 196)
AUG-CL3-game
'game'

(11) IsiZulu: /umu-ʃumajeli/ → [u.m̩.ʃu.ma.je.li] (Poulos & Msimang, 1998, p. 32)
CL1-preacher
'preacher'

The above examples from different Bantu languages show the varied representations of the output NC sequence emanating from /mu/ truncation. ChiNambya in (8) blocks moraicity by parsing the output NC as a complex homorganic segment (^{N}C) while IKalanga in (9) allows a surface representation where the nasal is a syllabic, tone-bearing unit that assimilates its place features to those of the following consonant. The Nyakyusa surface representation in (10) is similar to IKalanga except that the Nyakyusa syllabic nasal is non-moraic. The surface form in isiZulu (11) parses the output nasal as a non-assimilatory syllabic nasal [m̩]. This study aims to situate siSwati, a Bantu language spoken in ESwatini (formerly Swaziland) and some parts of South Africa (Poulos & Msimang, 1998; Malambe, 2006; Mkoko, 2021) within the wider discourse on the syllabfication of NCs emanating from /mu/ reduction in Bantu.

In this study, we show that the resultant NC in siSwati conforms to the preferred CV syllable structure which militates against complex constructions such as tautosyllabic vowels, branching onsets, and codas. We further demonstrate that the application and blocking of the /mu/ reduction phonological process depends on the size of the PStem it attaches to, as evident in the Bantu languages highlighted above. If monosyllabic, the stem is considered subminimal; therefore /mu/ reduction is blocked. However, if the stem is two or more syllables, it is considered well-formed hence creating a conducive environment for /mu/ truncation to occur. The application and blocking of /mu/ reduction in Bantu are conditioned by the disyllabic minimality requirement on the PWord, a condition that applies in siSwati. Word minimality, however, is a separate phonological phenomenon that this study does not discuss in detail.

Couched within Prince and Smolensky's (1993/2004) Optimality Theory (OT), the study provides a detailed descriptive and theoretical analysis of /mu/ reduction and its syllabification in siSwati. We note that the syllabification of the output NC sequence is driven by the interaction of various markedness and faithfulness constraints in the grammar of the language. In avoidance of output codas and the surface realisation of NCs as branching onsets, both marked syllable structures in siSwati, we show that the resultant nasal in /mu/ derived contexts – which are bimorphemic – appears as a non-moraic syllabic nasal instead of the generic ^{N}C segment attested in non-derived – monomorphemic – contexts. By attempting an analysis of NC syllabification in siSwati, the study aims to add onto the debate on NCs and their contentious syllabification in Bantu languages thereby contributing to linguistic typology.

We begin the discussion by providing a brief introduction that highlights the debate on the

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segmental status of NCs in various Bantu languages, and further discuss the syllabification effects triggered by /mu/ truncation. We also consider the non-derived and derived contexts across several morphosyntactic domains in siSwati, highlighting the different output representations of the NCs in each context. The study then presents a formal OT analysis of NC syllabification in siSwati and further attempts a typological analysis of /mu/ reduction in some of the Bantu languages under discussion. The study ends with a summary of the discussion on /mu/ reduction and syllabification in siSwati.

A BRIEF OVERVIEW OF SISWATI PHONOLOGY: THE SISWATI SYLLABLE STRUCTURE

In their crosslinguistic investigation of syllable forms, Clements and Keyser (1983, p. 30) classify languages according to the following syllable types:

(12) Type I: CV syllables

(13) Type II: CV, V.

(14) Type III: CV, CVC

(15) Type IV: CV, V, CVC, VC

They note that Type I and II languages consist of open syllables while enforcing a ban on marked structures such as complex clusters and coda specification. Type III and IV languages, on the other hand, allow the existence of closed syllables, with the possibility to contain a sequence of consonants and vowels, as guided by restrictions on the syllable template of individual languages. Based on this classification, Nguni languages fall under the Type II category that prefers open syllables (Khumalo, 1987). In the same vein, we concur with previous researchers such as Khumalo (1987), Malambe (2006), and Mkoko (2021), amongst others, that siSwati favours open syllables, a system that is largely characteristic of most Southern Bantu languages. The possible syllable shapes found in siSwati fall under V, CV, ^{N}CV, C^{G}V (Mkoko, 2021), all of which fit within the CV syllable template. We illustrate this in the examples below:

(16) /**ú**lele/ → [ú.le.le] - V.CV.CV
CL1.SM-sleep
's/he is sleeping'

(17) /**í**k^{h}ónà/ → [í.k^{h}ó.nà] - V.CV.CV
CL9.SM-here
'it is here'

(18) /sí-ŋkhwà/ → [sí.^{ŋ}**kh**^{w}à] - CV.CV
CL7-bread
'bread'

(19) /lí-ntʃʼwé.lè/ → lí.**ⁿtʃʼʷ**é.lè] - CV.CV.CV
CL5-chick
'chick'

(20) /úmù-ntfú/ → [ú.mù.**ⁿtf**ú] - CV.CV.CV
CL1-person
'person'

(21) /lí-tfúmbù/ → [lí.tfú.**ᵐbù**] - CV.CV.CV
CL5-intestine
'intestine'

/ú/ in (16) and /í/ in (17) are examples of permissible V-initial syllables at the word-initial boundary of a siSwati phonological word. Vowel initial syllables are common in the language even though these are restricted to the word-initial position, an indication that the language favours onsetful syllables. The remaining syllables consist of open CV syllables where the C-Slot is occupied by simple consonants. The examples in (18) to (21) show the syllabification of siSwati NCs and CGs in non-derived contexts. Note that each of the output forms is parsed as a homorganic, prenasalised segment, aligning with the preferred CV syllable template in siSwati.

Given the above representations of the syllable, the optimal syllable template in siSwati can be maximally parsed as [$^{N}C^{W}$] where the C-Slot is occupied by a consonantal segment that is both prenasalised and labialised as exemplified below:

(22) /íN-dvwángù/ → [í.ndvwá.ŋù]
CL9-cloth
'cloth'

(23) /tíN-tfwálà/ → [tí.ntfwá.là]
CL10-lice
'lice'

(24) /íN-ʤwàjélò/ → [í.nʤwà.jé.lò]
CL9-habit
'habit'

The evidence presented above points to the optimal representation of the siSwati syllable. For instance, in (24), the longest representation of the syllable consists of a prenasalised and labialised affricate [^{n}ʤ^{W}]. The next section of the dissertation explores the siSwati morphosyntax.

As already mentioned, syllables in siSwati must conform to the preferred CV syllable template in which the Consonant Slot (C-Slot) may be occupied by any simple consonant as well as labialised (C^{W}) and prenasalised (^{N}C) segments that are regarded as complex, but unitary segments. In this

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article, we demonstrate that, in addition to the Vowel Slot (V- Slot) being occupied by a simple vowel in the language, it can also be filled by the syllabic labial nasal [m̩] derived from /mu/ reduction. This study therefore presents evidence in support of the different representations of NC sequences in siSwati, adding onto the discussion on siSwati and Bantu segmental phonology.

THEORETICAL FRAMEWORK: OPTIMALITY THEORY

The study employs analytical insights drawn from Optimality Theory (Prince & Smolensky, 1993/2004). Optimality Theory (henceforth OT) is a branch of generative linguistics that deals with the universality of linguistic properties accessible to all languages. This constraint-based phonological theory is built on three premises: a) that languages have access to the same set of universal constraints; b) that constraint violation is tolerated as long as it is minimal; and c) that hierarchically ranked constraints yield language-specific grammars, depending on permissible syllable structures in each language. These aspects of universality, violability, and language-specific constraint hierarchy help various languages attain optimal well-formed syllable structures. In essence, languages have access to the same set of universal constraints but different hierarchical rankings to account for crosslinguistic variation (Archangelli, 1997; Kager, 1999). Out of the different possible output forms that a grammar generates, optimal candidates have minimal constraint violations between the Input and the Output.

In OT, constraint interaction provides evidence for permissible output forms in the grammar of a language. Kager (1999) notes that faithfulness to the input increases the propensity to parse marked structures in the output, whereas eliminating phonological markedness requires that the grammar violates certain correspondence restrictions. This study uses OT to account for the repair of dispreferred underlying constructions through constraint interaction, and further demonstrate how siSwati grammar uses the interaction between markedness and faithfulness constraints to ensure that NCs emanating from /mu/ truncation align with siSwati syllabic well-formedness.

The markedness constraint that enforces obligatory /mu/ elision is HighVowelElision (HVE). This indomitable constraint militates against the parsing of high vowel /u/ in Class 1 and 3 /mu/ prefix before polysyllabic stems. Harford and Malambe (2011) propose that /u/ only deletes if preceded by the labial nasal [m], and appears within a non-prominent environment such as an unstressed syllable or in an affix. In such cases /mu/ contracts if it appears within the Class 1 and 3 prefix. Any candidate that remains faithful to the input by parsing the high vowel /u/ violates this high ranking markedness constraint. Since the optimal candidate must delete the high vowel /u/, MAX-IO, a faithfulness constraint that militates against segment elision (Kager, 1999), is violated. Furthermore, the resultant nasal is parsesd as a syllabic, non-assimilatory segment thus in violation of PEAK, a constraint requires that all syllables have a vowel (Archangeli, 1997).

In addition, changing the input form of the nasal in siSwati dictates the violation of IDENT- IO that enforces faithfulness to the specifications of input segments, in this case nasality (Kager, 1999; Brakovic, 2007). In this analysis, the IDENT constraint requires the underlying form of the nasal to assimilate its place of articulation and further surface as a prenasalised segment. This faithfulness constraint, which we formalise as IDENT$^{(\text{PLACE})}$, accounts for nasal assimilation in the syllabification of non-derived NCs. Further, the grammar should account for cluster intolerance in siSwati. We include two syllable structure constrains - COMPLEX$^{\text{ONSET}}$ and NoCoda - to account for syllabic well-formedness of the output candidates. COMPLEX$^{\text{ONSET}}$ is a markedness constraint that restricts the existence of consonant clusters (Kager, 1999; Kadenge, 2015). This would mean that even though /mu/ reduction is expected to yield a nasal and consonant sequence, these two segments cannot be parsed as a cluster [NC] or a prenasalised segment [$^{\text{N}}$C]. NoCoda comes into play to enforce open syllables (Archangeli, 2007), prohibiting the parsing of the resultant nasal as the coda of the pre-prefix.

The grammar also requires adjacent output segments to agree for a specific feature. In this analysis, we use AGREE$^{(\text{NASAL})}$ as proposed by Brakovic (2007), to ensure that the nasal and following consonant share the same place features. The ranking of this constraint will determine optimal output candidates between derived and non-derived NCs. /mu/ reduction in siSwati reveals how ranking AGREE$^{(\text{NASAL})}$ higher than IDENT$^{(\text{PLACE})}$ forces the input nasal to surface as a homorganic and prenasalised segment, while re-ranking the constraints as IDENT$^{(\text{PLACE})}$ >>> AGREE$^{(\text{PLACE})}$ suffices for phonologically derived environments where the output nasal remains faithful to the input since it does not assimilate. The two constraints assume a unidirectional progressive assimilation that changes the nasal place feature rather than the consonant it precedes. It also targets the nasal segment such that it surfaces as either homorganic or syllabic, with the assumption that the assimilation only occurs in non-derived contexts.

DATA ANALYSIS

This section presents some of the morphosyntactic categories in which the class 1 and 3 prefix is reduced. The discussion begins with the Prefix + Stem combination in Classes 1 and 3 nouns.

/mu/ Reduction in Nominal Classes 1 and 3

Firstly, /mu/ is contracted in Class 1 and 3 nouns that are more than one syllable. In each instance, the NC sequence is in a heterosyllabic distribution, with the labial nasal [m̩] parsed as a non-homorganic, syllabic segment while the consonant forms an ONSET of the following syllable. We illustrate this representation below:

(25) /úmù-ʃánà/ → [ú.m̩.ʃá.nà] *[u.ⁿ***ʃa***.na]
CL1-niece/nephew
'niece/nephew'

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(26) /úmù-fát´ì/ → [ú.m̩.fá.t´ì]
CL1-wife
'wife'

(27) /úmù-fúndzì/ → [ú.m̩.fú.ⁿdzì] *[ú.m̩.fú.**n̩.**dzi]
CL1-learner
'learner'

(28) /úmù-ɲáŋò/ → [ú.m̩.ɲá.ŋò]
CL3-door
'door'

(29) /úmù-séɓént´i/ → [ú.m̩.sé.ɓé.ⁿt´i] *[ú.m̩.sé.ɓé.**n̩**.*ti*]
CL3-work
'work'

(30) /úmù-tsàɲélò/ → [ú.m̩.tsà.ɲé.lò]
CL3-broom
'broom'

The examples above present the effects of /mu/ deletion in Classes 1 and 3 nominals, with all /mu/ prefixes occurring before polysyllabic nominal stems hence their truncation to a syllabic, non-assimilatory [m̩]. For instance, the Class 1 noun /úmù-ʃánà/ *'niece/nephew'* in (25) is realised as [ú.**m̩**.ʃá.nà], where the resultant nasal syllabifies as a syllabic, non-homorganic segment. As expected, the grammar does not enforce homorganicity on these NCs, displaying an ungrammatical construction *[u.***ɲʃa***.na] that would be a result of enforced homorganicity in a phonologically derived context. The same nasal syllabification process is blocked in [ú.m̩.fú.***ⁿdz***ì], and [ú.m̩.sé.ɓé.***ⁿt***´ì], which do not appear as syllabic **n̩.dzi* and **n̩.ti* since they appear within the stem, which in this case is a non-derived environment. This indicates that parsing of the nasal as a syllabic segment in NC sequences is not automatic but restricted to /mu/ contracted contexts; otherwise, siSwati maintains homorganicity between the nasal and the following consonant. Loanwords borrowed from English and adapted into siSwati phonology display similar syllabification effects.

/mu/ Reduction in Classes 1 and 3 Loanwords

Loanwords usually undergo phonetic and phonological adaptation into the adoptive language (Batibo, 2002). In examples (31) to (34) the study shows how 'personal' and 'impersonal' nouns assigned into Classes 1 and 3 also conform to the obligatory truncation of the class prefix /mu/ in polysyllabic stems.

(31) /úmù-bàbàt´ísì/ → [ú.m̩.bà.bà.t´í.sì]
CL1-baptist

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‘baptist’

(32) /úmù-díkhónì/ → [ú.m̩.dì.khó.nì]
CL1-deacon
‘deacon’

(33) /úmù-bínì/ → [ú.m̩.bí.nì]
CL3-bin
‘bin’

(34) /úmù-ʃínì/ → [ú.m̩.ʃí.nì]
CL3-machine
‘machine’

The above examples demonstrate that loanwords behave similarly to Classes 1 and 3 indigenous nouns where the application of the /mu/ reduction process gives rise to a non- assimilatory, syllabic nasal [m̩]. For example, ‘deacon’ in (32) is realised as [u.m̩.dì.k^{h}ó.nì], with the resultant nasal becoming a syllabic, but non-homorganic [m̩] rather than a homorganic NC *[ú.^{n}***d***ì.k^{h}ó.nì]. This is further evidence for the phonological integration of loanwords in conformity to the grammar of the language.

Truncation of Classes 1 and 3 OM in Qualifiers

We further present evidence of how high vowel /u/ in the Classes 1 and 3 object markers (OM), is elided. In the formation of qualifiers such as adjectives and relative pronouns, siSwati uses formative marker /la/ followed by the OM, plus the morpheme that signifies the qualifier. We use adjectives to illustrate /mu/ truncation in qualifiers:

(35) /ló-mù-dvùnà/ → [ló.m̩.dvù.nà]
QUAL-CL1.OM-male
‘the male one’

(36) /ló-mù-síʄàt´í/ → [ló.m̩.sí.ʄà.t´í]
QUAL-CL1.OM-female
‘the female one’

(37) /ló-mù-k^{h}úlù/ → [ló.m̩.k^{h}ú.lù]
QUAL-CL1/3.OM-big
‘the big one’

(38) /lo-mù-ŋ|ánè/ → [lo.m̩.ŋ|á.nè]
QUAL-CL1/3.OM-small
‘the small one’

The data presented above demonstrates the truncation of OMs in the formation of adjectives. As indicated, these NCs display the same behaviour as the Classes 1 and 3 nominal prefixes where the resultant nasal is syllabified as syllabic and non-assimilatory, in line with the syllabification effects in /mu/ derived contexts.

To ensure that the output nasal is realised as a non-homorganic [m̩], the grammar places IDENT$^{(PLACE)}$, an Input-Output faithfulness constraint that requires the input nasal to remain labial, above AGREE$^{(NASAL)}$, an Output-Output correspondence constraint that enforces homorganicity between the nasal and the following consonant. COMPLEX^{ONSET} and NoCoda, are high-ranking that eliminate branching onsets and surface codas. PEAK allows syllabicity of the output nasal, and therefore ranks low since it is violable. This constraint hierarchy can be schematically represented in Tableau 1 as follows:

Tableau 1: /mu/ reduction in siSwati nominals and verbs

/úmù-ʃánà/	HVE	Complex Ons	NoCoda	Ident^{Place}	Agree^{Nasal}	MAX-IO	PEAK
a) ú.mù.ʃá.nà	*!						
☞ b) ú.m̩.ʃá.nà					*	*	*
c) ú.ⁿʃá.nà				*!		*	*
d) ú.mʃá.nà		*!				*	
e) ú.m.ʃá.nà			*!			*	

In Tableau 1, candidate (a) is eliminated because it parses high vowel /u/ that has to be obligatorily deleted in Classes 1 and 3. This candidate fatally violates H^{igh}V^{owel}E^{lision}, a high-ranking constraint in the grammar. Candidate (c) does not surface as our ultimate winner since it assimilates and prenasalises the resultant nasal in a derived context, a representation that the grammar prohibits. Candidate (d) incurs a fatal violation of COMPLEX^{ONSET}, another high-ranking constraint since siSwati prohibits cluster specification of the resultant NC sequence. The last candidate is ruled out because the resultant nasal surfaces as the coda of the pre-prefix thus incurring a violation of the NoCoda constraint. Candidate (b) surfaces as the optimal winner since it satisfy HVE, COMPLEX^{ONSET}, and NoCoda, the indomitable constraints in the grammar on derived NC syllabification. This analysis indicates that in siSwati, ranking HVE, COMPLEX^{ONSET}, NoCoda, IDENT$^{(PLACE)}$ higer than AGREE$^{(NASAL)}$, MAX-IO, PEAK allows NCs in /mu/ reduction contexts to surface as syllabic, non-assimilatory [m̩] in the grammar.

Based on the discussion thus far, NCs derived from /mu/ truncation would be schematically represented as (b) while those that occur in non-derived ones would appear as (a).

(39)

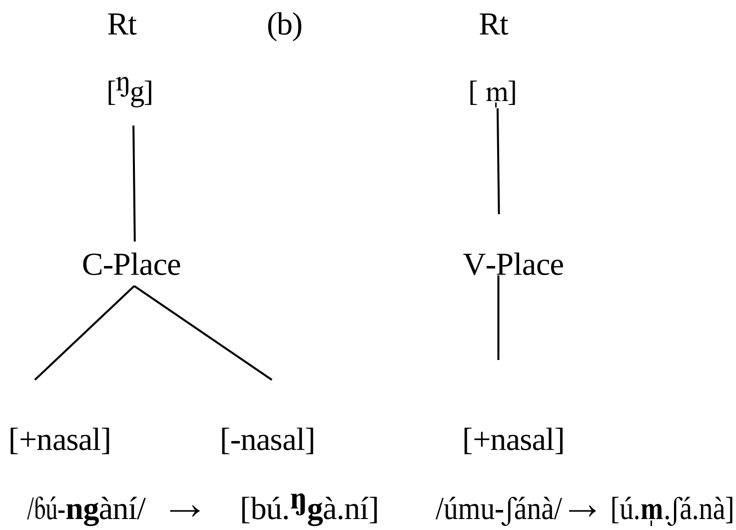

Figure 1: The representation of prenasalised NCs and syllabified nasals in siSwati

Earlier on, the study showed how chiNambya differs fromn siSwati and isiZulu that display variation in the output NC syllabification depending on whether the NC occurs in a derived versus non-derived context. ChiNambya parses prenasalised segments across all contexts: there is no disparity in NC syllabification in the grammar. In OT terms, chiNambya therefore has a different ranking to that of siSwati and isiZulu. Tableau 2 below schematically represents the constraint ranking in chiNambya:

Tableau 2: /mu/ reduction in chiNambya

/u-mu-bali/	HVE	CompOns.	NoCoda	AgreeNasal	PEAK	IdentPlace	MAX-IO
a) u.mu.ba.li	*!					*	
b) u.mba.li		*!					*
c) um.ba.li			*!			*	*
☞ d) u.ᵐba.li						*	*
e) u.m̩.ba.li					*!		*

Similar to isiZulu and siSwati, chiNambya prohibits coda specification and cluster realisation of the resultant nasal hence we eliminate candidates (b) and (c) as they violate the two high ranking, constraints, COMPLEONSET and NoCoda. Similarly, parsing the high vowel /u/ incurs a fatal violation of HVE, another indomitable constraint. We therefore eliminate candidate (a). However, unlike the two languages where the resultant nasal can surface as a syllabic, non-assimilatory [m̩], chiNambya prohibits syllabic nasals therefore necessitating the elimination of candidate (e) as a possible winner. The possible chiNambya grammar for both derived and non-derived contexts is AGREE$^{\text{(NASAL)}}$, PEAK>>>> IDENT$^{\text{(PLACE)}}$, indicating that homorganicity outranks input faithfulness in derived NCs, allowing the surface realisation of derived NCs as $^{\text{N}}$C rather than the [m̩] attested in the two Nguni languages discussed herein.

Unlike the siSwati and isiZulu grammar that parse a syllabic and non-assymilatory [m̩] in the output, Nyakyusa and iKalanga output nasals emanating from /mu/ reduction are assimilaroty. In this regard, in the Nyakyusa and iKalanga grammars, AGREE$^{\text{(NASAL)}}$ is indomitable to allow the assimilation of the input labial nasal. PEAK remains a low-ranking constraint. Tableau 3 is an illustration of the disparate ranking of the proposed constraints applied in Nyakyusa, a constraint hierarchy that suffices for iKalanga.

Tableau 3: /mu/ reduction in Nyakyusa

/ʊmu-kino/	HVE	ComplexOns.	NoCoda	AGREE NASAL	MAX-IO	IDENTPLACE	PEAK
a) ʊ.mu.ki.no	*!						
☞ b) ʊ.ŋ̩.ki.no					*		*
c) ʊ.ᵑki.no					*	*!	
d) ʊ.mki.no		*!		*	*		
e) ʊm.ki.no			*!	*	*		
f) ʊ.m̩.ki.no				*!	*		*

Tableau 3 shows that the resultant NC in Nyakyusa cannot surface as either a cluster or coda, therefore eliminating candidates (c) and (d) for their violation of COMPLEX$^{\text{ONSET}}$ and NoCoda. Candidate (a) is eliminated for parsing the high vowel /u/ in violation of HVE. Candidate (e) fatally violates AGREE$^{\text{(NASAL)}}$, a high-ranking constraint militating against non-assimilatory surface nasals. This construction where the NC from derived from /mu/ truncation surfaces as a non-assimilatory but syllabic segment, like siSwati and isiZulu, is not a possible winner for Nyakyusa. Candidate [ʊ.ŋ̩.ki.no] in (b) surfaces as the optimal winner since it parses the resultant nasal as a syllabic segment. The only difference is that the nasal assimilates its place features, violating the low-ranking constraint PEAK.

The different representations of the resultant NCs in the Bantu languages discussed herein

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provide evidence that even though languages have access to the same universal constraints; constraint interaction gives rise to different grammars motivated by what is considered syllabic well-formedness in each language. As already mentioned, OT is built on the premise that languages have access to the same set of universal constraints but that these constraints are ranked differently depending on the permissible syllable structures in individual grammars. In /mu/ reduction, the different rankings of IDENT(PLACE), AGREE(nasal) and PEAK indicate the typological similarities and differences in the languages discussed herein. A summary of these rankings is presented in Table 1 below:

Table 1: The ranking of NC syllabification constraints in Bantu /mu/ reduction

SISWATI:	IDENT(PLACE)	must outrank	AGREE(NASAL), PEAK
ISIZULU:	IDENT(PLACE)	must outrank	AGREE(NASAL), PEAK
CHINAMBYA:	AGREE(NASAL), PEAK	must outrank	IDENT(PLACE)
NYAKYUSA:	AGREE(NASAL)	must outrank	IDENT(PLACE), PEAK
IKALANGA:	AGREE(NASAl)	must outrank	IDENT(PLACE), PEAK

/mu/ Truncation in SiSwati Reduplicated Forms

The final evidence we present for /mu/ contraction illustrates the realisation of NCs in siSwati reduplicated verbs. As discussed in Downing (1997) and Malambe (2006), well-formed PWords in siSwati reduplication copy the first two syllables of the verb stem (40) to (43) while the monosyllabic verb stems in (44) to (47) rely on augmentation through epenthesis to enforce restrictions on the binarity of a reduplicant.

Disyllabic stems

(40) /tsátsà/ → [tsatsa – tsatsa] ‘take a little bit!’

(41) /ɓútà/ → [ɓuta – ɓuta] ‘ask a little bit!’

(42) /gézà/ → [geza – geza] ‘bath a little bit!’

(43) /phéɠà/ → [pheɠa – pheɠa] ‘cook a little bit’

Monosyllabic stems

(44) /fá/ → [fá – ji – fá] ‘die a little a bit’

(45) /ɮá/ → [ɮá – ji – ɮá] ‘eat a little bit’

(46) /phá/ → [phá – ji – phá] ‘give a little bit’

(47) /lwá/ → [lwá – ji – lwá] ‘fight a little bit’

The examples in (40) to (43) are disyllabic and thus copy both syllables of the verb in line with the requirements of the reduplication process. On the contrary, the monosyllabic input verbs in (44) to (47) require augmentation through [ji] epenthesis to satisfy binarity restrictions on the siSwati reduplicant.

According to the morphosyntactic structure of the Bantu verb (Kula, 2002; Mudzingwa, 2010; Mudzingwa & Kadenge, 2014; Downing & Mtenje, 2017), the Macro Stem (MStem) consists of the OM and other derivational markers up to and including the inflected verb stem. Even though both the OM and the verb stem form part of the MStem in the hierarchical structure of the verb, the target for the reduplication process is only the verb stem, and not the OM and other affixes contained therein. For this reason, the OM is placed outside of the target for reduplication as illustrated the examples below. The examples consist of the OM and the verb stem.

(48) /mù-mbóɲé/ → [m̩.mboɲa-mboɲe]
CL1.OM-cover
'cover him/her a little bit!'

(49) /mù- mpímbè/ → [m̩.mpimba-mpimbe]
CL1.OM-snitch
'snitch on him/her a little bit!'

(50) /mù-mémè/ → [m̩.mema-meme]
CL1-invite
'invite him/her a little bit

(51) /mù-tsátsè/ → [m̩.tsatsa-tsatse]
CL1.OM-carry
'carry him/her a little bit!'

The above examples show the target for verb reduplication in siSwati. They illustrate how the syllabic nasal is parsed outside the bare stem and is subsequently not reduplicated as the first syllable of the verb. For instance, /mu-tsatse/ in (51) is realised as [**m̩.**tsatsa-tsatse] and not prenasalised *_[^{n}**tsa**tsa-tsatse]_ or even syllabic *_[**m̩.tsa**-**m̩**tsatse]_ where the first two syllables of the construction are reduplicated. This is evidence that the nasal does not constitute the same syllable with the following consonant, but belongs to a separate syllable that does not participate in the reduplication process.

Conclusion

The study set out to investigate /mu/ truncation effects in siSwati, making reference to other Bantu languages for linguistic typology. The goal was to establish the contrast in NC syllabification in siSwati, explaining how this disparity is conditioned by the interaction between phonology and morphology, whereupon if the sequence occurs in phonologically derived contexts, the nasal is realised as the syllabic but non-moraic segment [m̩]. However, if it occurs in a non-derived context, it is homorganic with the consonant that follows, and is parsed as a prenasalised, unitary segment [^{N}C]. This representation also holds for isiZulu, a sister language to siSwati. Furthermore, other languages represent their resultant NCs differently, with chiNambya triggering homorganicity in all contexts while Nyakyusa has the assimilatory, syllabic nasal in /mu/ truncated forms but prenasalised segments in non-derived environments. Ikalanga also displayed disparate syllabification effects where the output homorganic nasal is syllabic and tone-bearing. This crosslinguistic dispensation of the syllabification of the NC indicates that, even though languages are susceptible to the same phonological processes, the phonological effects are typologically different. The discussion on /mu/ reduction harmonises with the aim of the article in that it provides evidence for the interaction between phonology and morphology in phonological analysis. It further highlights the segments that can occupy the C-Slot and the V-Slot in siSwati and other languages, to account for conformity to the Bantu CV syllable template. The table below summarises the /mu/ reduction effects in the languages discussed in this article.

Table 2: A summary of /mu/ truncation effects in some Bantu languages

	Syllabicity	Prenasalisation	Assimilation	Post-nasal hardening	Moraicity
SiSwati	✓	x	x	x	x
IsiZulu	✓	x	x	x	x
ChiNambya	x	✓	✓	✓	x
Nyakyusa	✓	x	✓	✓	x
IKalanga	✓	x	✓	x	✓

In conclusion, siSwati presents an asymmetrical distribution of its NCs across various contexts. The default representation is prenasalisation as evident in non-derived contexts as well as Class 9/10 morphologically-derived NCs, while /mu/ derived contexts parse a non-assimilatory syllabic nasal in the output. The discussion above has demonstrated that the same set of constraints yields the dual representation of the NC in siSwati as either syllabic [V.N̩.C] or prenasalised [V.^{N}C], respectively.

References

Archangeli D. (1997). Optimality Theory: An introduction to linguistics in the 90s. In: Archangeli D, Langendoen DT (eds.), *Optimality Theory: An Overview*. Malden: Blackwell Publishers. pp.1-32.

Batibo, H. M. (2002). The evolution of the KiSwahili syllable structure. *South African Journal of African Languages, 22*, 1-10. DOI: 10.1080/02572117.2002.10587493.

Beddor, P. S., & Onsuwan, C. (2003). Perception of prenasalised stops. Paper presented at the 15th International Congress of Phonetic Sciences, Barcelona, Spain.

Braković, E. (2007). Local assimilation and constraint interaction. In P. de Lacy (Ed.), *The Cambridge handbook of phonology* (pp. 335-352). Cambridge University Press.

Cahill, M. (1998). Nasal assimilation and labia-velar geometry. In I. Maddieson & T. J. Hinnebusch (Eds.), *Language history and linguistic description in Africa* (2nd ed.): *Trends in African Linguistics* (pp. 127-136). Africa World Press.

Clements, G, N., & Keyser, S.J. (1983). *CV Phonology: A generative theory of the syllable*. MIT Press.

Downing, L. J. (2005). On the ambiguous segmental status of nasal in homorganic NC sequences. In M. van Oosterndorp & J. van der Weijer (Eds.), *The internal organisation of phonological segments* (pp. 183-216). Mouton de Gruyter.

Downing, L.J., & Mtenje, A. (2017). *The Phonology of Chichewa*. Oxford University Press.

Harford, C., & Malambe, G. B. (2011). A nominal preprefix in siSwati: A mixed system. Paper presented at the XI Conference of the Linguistic Association of SADC Universities, Zambia.

Harford, C., & Malambe, G. B. (2015). Optimal register variation: High vowel elision in siSwati. *Southern African Linguistics and Applied Language Studies*, *33*, 343-357.

Hubbard, K. (1995). 'Prenasalised consonants' and syllable timing: Evidence from Runyambo and Luganda. *Phonology, 12*(2), 235-256.

Kadenge, M. (2014). Comparing nasal-obstruent clusters derived from /mu-/ reduction in Shangwe and Zezuru: An Optimality Theory analysis. *Language Matters: Studies in the Languages of Africa, 45*(1), 40-62.

Kadenge, M. (2015). The augment and /mu-/ reduction in Bantu: An Optimality Theory analysis. *South African Journal of African Linguistics, 35*(1), 93-104.

Kadenge, M., & Chebanne, A. (2017). Hiatus resolution and /mu/ prefix reduction in iKalanga. South African Journal of African Languages. 37(2), 173-186.

Kager, R. (1999). *Optimality Theory*. Cambridge University Press.

Khumalo, J. S. M. (1987). *An autosegmental account of Zulu phonology* [Doctoral dissertation, University of the Witwatersrand].

Kula, N. C. (2002). *The phonology of verbal derivation in Bemba* [Doctoral dissertation, Leiden

University].

Malambe, G. B. (2006). *Palatalization and other non-local effects in Southern Bantu languages* [Doctoral dissertation, University College London].

Mkoko, C. H. (2021). *Some aspects of siSwati segmental phonology*. PhD Dissertation, University of the Witwatersrand.

Morrison, M. (2009). Homorganic NC sequences in Kibena: Pre-nasalised consonants, consonant clusters or something else? *Rice Working Papers in Linguistics*, *1*(1) 223- 241.

Mudzingwa, C. (2010). *Shona morphophonemics: Repair strategies in Karanga and Zezuru* [Doctoral dissertation, University of British Columbia].

Mudzingwa, C., & Kadenge, M. (2014). Class 1 deverbal and non-deverbal nouns in Shona: A comparative analysis. *Stellenbosch Papers in Linguistics Plus, 44*(1), 129-148.

Mwita, L.C. (2009). The adaptation of Swahili loanwords: A constraint-based analysis. *Journal of Pan African Studies*, *2*(8), 46-61.

Odden, D. (2015). *Bantu Phonology*. Oxford University Press Online.

Persohn, B. (2019). /mu/ and mu-reduction in Nyakyusa. *South African Journal of African Languages, 39*(2), 191-203. https://doi.org/10.1080/02572117.2019.1618023

Poulos G, Msimang CT. (1998). *A linguistic analysis of the Zulu language*. Pretoria: Via Afrika.

Prince, A., & Smolensky, P. (2004). *Optimality: Constraint interaction in generative grammar*. Blackwell.

Sibanda, G. (2004). *Verbal phonology and morphology in Ndebele* [Doctoral dissertation, University of California, Berkeley].

Tak, J. (2011). Universals of prenasalised consonants: Phonemic or derived, single or complex? *Journal of Universal Language*, *12*(2), 127-158.

Tucker-Childs, G. (2003). *An introduction to African languages*. John Benjamins.

Ziervogel, D., & Mabuza, E.J. (1976). *A grammar of the Swati language*. J. L. Van Schaik Ltd.