Long Distance Bantu Nasal Agreement: Harmony or Allomorphy

Yongqing Ye
Michigan State University

1 Introduction

Study of the phonology of long distance agreement raises questions on many issues in rules, representations and the possibilities of phonological processes. Anderson (1975) proposes a set of divisions between different types of rules in the process of mapping morphemic representations into sounds. He argues for constraining the application of phonological rules, and one such case is long-distance phonological rules. He states that morphologically conditioned rules can operate at a greater distance than phonological rules, and thus it is possible to impose a restriction on phonological rules which can only affect the "nearest relevant segment" (p.42). In the spirit of Anderson (1975), this paper sets out to examine long-distance nasal harmony in Bantu languages. It argues that ascribing long-distance agreement patterns to phonologically conditioned suppletive allomorphy[1] clarifies what a possible phonological process is and also provides further evidence for the possibility of strictly local phonological processes.

Nasal assimilation over a string of segments is typically analyzed as feature spreading (Piggott 1987; Hyman 1982; Walker 2014; Peng 2000) or feature copying (as in Chomsky 1968; Nevins 2010; Reiss 2007). Nasal assimilation may also occur at a distance across other 'neutral' or 'non-participating' segments. A number of Bantu languages such as Kongo (Ao 1991), Yaka (Walker 2000; Hyman 1995; Walker 2011; Eynde 1968; Kidima 1991), Lamba (Kenstowicz and Kisseberth, 1979), Bemba (Kula 2002), Chokwe, Herero (Choti 2015; Booysen 1982), Ila (Greenberg 1951), Kwanyama (Meinhof 1932), Lunda, Subiya, and Tonga (Collins 1962) have this type of long-distance or transvocalic nasal harmony (henceforth LDNA), where consonants appear to harmonize for nasality across intervening consonants and vowels (Greenberg 1951).

A nasal induces nasalization of voiced consonants at any distance to its right across morphemes (the stem and the suffix morphemes). The perfective suffix /-idi/ or /-ili/ attaches to imperative stems, and the coronal in the suffix is nasalized as [n] as show in (1). The stem form that does not contain a nasal segment is shown for comparison (2); it does not trigger nasal harmony. It is clear from the contrast between the two types of stem forms that it is the presence of a nasal that triggers the harmony in the suffix.

(1) a. /-**m**íítuk-i**l**i/ → [-**m**íítuki**n**i] 'sulk.PRF'

(2) a. /kik-i**d**i/ → [kik-i**d**i] 'erase.PRF'

b. /ki**n**-i**d**i/ → [ki**n**-i**n**i] 'dance.PRF'

This is a progressive, or stem-controlled assimilation pattern given the trigger nasal precedes the target and the trigger is always in the stem and the target consonants is always in the suffix. LDNA has been analyzed as nasal harmony either by spreading (Hyman 1995) or by correspondence (Walker 2000). The possibility of LDNA as a case of phonologically conditioned suppletive allomorphy (henceforth PCSA) has not been fully explored. This paper aims to show that without appealing to additional infrastructure to the theory of phonology, we can obtain the effects of long-distanceness, structural preservation and opacity of LDNA from independently motivated properties of allomorphy, which moreover fits well into the general characters of PCSA. Ascribing the pattern to allomorphy adds to the discussion of what a possible phonological process

[1] Phonologically conditioned suppletive allomorphy (PCSA) is defined as "the variation in shapes of morphemes that do not follow from general phonological processes of the language" (Paster 2014). In the Bantu nasal harmony case, there is no attested phonological rule in the languages that states that /d/ changes into [n] after nasal segments. In other words, the harmony pattern is not a general phonological process in these languages. Thus it fits the description for PCSA.

© 2022 Yongqing Ye
Proceedings of *AMP 2021*

is and also provides further evidence for the possibility that phonological processes, and more specifically harmony processes, need to be local.

2 The basic pattern

In Yaka, the consonant /d/ or /l/[2] assimilates in nasality across one or multiple segments as shown in Table 1. It is considered to be LDNA because the intervening segments are not nasalized. Most cases of this processes center around the realization of the perfective suffix /-idi/, which alternates between [-idi] and [-ini]. This pattern is also found in other Bantu languages such as Bemba, Lamba, Tonga, Luba, Suku, etc. where the equivalents for perfective suffixes [-idi] and [-ele].[3] are pronounced with a nasal segment [n] when the final segment of the root is a [+nasal] consonant. In some of the aforementioned languages, this process also applies to the applicative suffix /-id/, which is pronounced as [-in] when it follows a full nasal segment[4] in the stem.

The agreement process is also observed across multiple intervening segments that are not affected by the nasal harmony. These non-participant segments are considered to be transparent to the harmony. These neutral segments (both vowels and consonants), including voiceless obstruents, do not block harmony (Odden 2015; Maddieson 2019; Piggott 1996). Additionally, Nasal-Consonant clusters (NC) are also 'neutral' to nasal harmony. In other words, they behave exactly like vowels and voiceless consonants in that they do not participate or block in nasal harmony, nor do they trigger nasal harmony. For example, the NC cluster in [do**ng**-id-] 'teach.APPL' does not spread its nasal feature to the suffix /id/. The suffix in [**n**uu**ng**-ini] 'win.PRF' is nasalized by the stem-initial nasal and the NC sequence does not block nasal harmony.

[yad-i**d**i]	'spread.PRF'	[ya**n**-i**n**i]	'cry out.PRF'
[keb-e**l**e]	'pay attention to.PRF'	[ke**m**-e**n**e]	'groan.PRF'
[sol-e**l**e]	'deforest.PRF'	[so**n**-e**n**e]	'color.PRF'
[ha**m**uk-i**n**i]	'give away.PRF'	[**m**iituk-i**n**i]	'sulk.PRF'
[**m**ek-e**n**e]	'try.PRF'	[**n**yeek-e**n**e]	'bend down.PRF'
[fut-i**d**-]	'pay.APPL'	[hu**n**-i**n**-]	'cheat.APPL'
[hang-i**d**-]	'made.APPL'	[**n**at-i**n**-]	'carry.APPL'
[hyook-i**d**-]	'go through.APPL'	[**m**iituk-i**n**-]	'sulk.APPL'
[dong-i**d**-]	'teach.APPL'	[so**n**-i**n**-]	'color.APPL'
[**m**ek-i**n**-]	'try.APPL'	[**n**utuk-i**n**-]	'bow.APPL'

Table 1: LDNA in Yaka, data from Hyman (1998) and Hyman (1995), adapted from Eynde (1968) and Ruttenberg (1971)

The same nasal harmony pattern is observed in Kongo as shown in Table (2), the coronal stop and liquid /d/ and /l/ in the perfective suffixes /idi/ (active) and /ulu/ passive are targeted and surface as [ini] and [unu] in the suffix respectively.

[2] /d/ is pronounced [l] in Yaka except when preceded by [n] or followed by [i] (Hyman 1995). In many Bantu languages, the distribution of [d] and [l] are predictable and in complementary distribution. They are therefore likely the same phoneme.

[3] The perfective suffix takes the form [-idi] after vowels /i/, /u/ and /a/ but is [-ele] after the vowels /e/ and /o/ in these languages (Hyman 1998). The vowel alternation in the suffixes in the languages discussed in this paper is a result of vowel height harmony (Hyman 1995; Choti 2015). Since vowel harmony is beyond the scope of this squib, it is not discussed here.

[4] A full nasal segment is considered to be a nasal segment that is not part of a prenasalized consonant cluster (not in a NC sequence).

[-suk-i**d**i]	'wash.PRF'	[-**n**ik-i**n**i]	'grind.PRF'
[-suk-u**l**u]	'wash.PRF.PASS'	[-**m**ik-i**n**i]	'ground.PRF'
[-bud-i**d**i]	'hit.PRF'	[-si**m**-i**n**i]	'prohibit.PRF'
[-bud-u**l**u]	'hit.PRF.PASS'	[-ku**n**-i**n**i]	'plant.PRF'
[sakid-i**l**-a]	'congratulate.APPL'	[**n**at-i**n**-a]	'carry.APPL'
[-toːt-i**l**-a]	'harvest.APPL'	[-du**m**uk-is-i**n**-a]	'cause to jump.APPL'

Table 2: LDNA in Kongo, data from Walker (2011) and Ao (1991)

Table 3 shows the same nasal harmony pattern observed in Herero, in which the liquid /r/ in the prefective suffix /-ire/ is nasalized and surfaces as [n].

UR	SR	
/N-ba-mu**n**-i**r**e/	[mbamu**n**-i**n**e]	'(I) see.PRF.PAST'
/N-ba-ma**n**-i**r**e/	[mbama**n**-e**n**e]	'(I) finish.PRF.PAST'
/N-ba-pe**m**-i**r**e/	[mbape**m**-e**n**e]	'(I) blow my nose.PRF.PAST'

Table 3: Nasal agreement in Herero, data from Choti (2015), adapted from Kula (2002)

3 Previous analysis

Analysis on LDNA in Bantu has focused on restricting spreading with phonological mechanisms (Ao 1991; Odden 1994; Archangeli 1986), correspondence (Walker 2000; Rose 2004) and representations (Pulleyblank 1989). Piggott (1996) argued for a case of suprasegmental spreading for Bantu nasal harmony. Specifically, the feature [+nasal] spreads on a level of syllable-organizing node, or "harmony foot" and the non-participating segments are not specified for [+nasal]. Pulleyblank (1989) argued that there is cross-linguistic combinatorial restrictions between particular segments and some features. In other words, certain opaque class of segments resist bearing the featured that is being spread. Specifically, central to the issue of nasal spreading, the feature of nasality is much more likely to appear on voiced segments in comparison to voiceless ones. Voiceless segments such as /t/ and /k/ cannot be specified for [nasal] and thus seem to be transparent to nasal spreading. Walker (2000) and Rose (2004) considered the case of long-distance Bantu nasal harmony to be a correspondence relationship between segments in the output. Archangeli (1986) make a distinction between the domain of application of the spreading process with "minimal/maximal scansion", which states that a feature (in this case [+nasal]) may target either the immediately dominating mother node (aka. minimal scansion) or the next segment (aka. maximal scansion). The segment /d/ has an appropriate landing site for the feature [+nasal] since both the nasal and /d/ share a mother node for soft palate; however, vowels and voiceless consonants lack soft palate node thus cannot participate in nasal harmony. To summarize, the nasal harmony process is analyzed with a minimal scansion rule. The feature [+nasal] spreads to the next soft palate node, which is on /d/ and /d/ also lacks the [+nasal] feature. Vowels and voiceless consonants are skipped.

3.1 *Transparent NC sequences* The transparency of NC sequences has been contributed to a debate about their syllabic structure representation and to their featural specification. As observed in multiple Bantu languages, LDNA is not conditioned by an preceding preceding prenasalized consonant. NC sequences such as [mb] and [ng] do not trigger harmony as shown in Table 4 and Table 5. There are cases where nasal harmony is blocked. In Lamba, nasal harmony only applies across an intervening vowel (i.e. only in transvocalic contexts) but not across longer stretches of vowels and consonants (Odden 1994; Odden 2015).

Non-trigger		Non Blocker	
[hee**ng**-e**l**e]	'sift.PRF'	[-naa**ng**-i**n**i]	'last.PRF'
[bii**mb**-i**d**-i]	'embrace.APPL'	[mee**ng**-e**n**e]	'hate.PRF'
[kuu**nd**-idi]	'bury.PRF'	[nuu**ng**-i**n**i]	'win.PRF'

Table 4: The non-participation of NC segments in Yaka nasal harmony, data adapted from Hansson (2010)

Lamba	[uu**m**-i**n**e]	'dry.PRF'
Lamba	[pat-i**l**e]	'scold.PRF'
Lamba	[nw-ii**n**e]	'drink.PRF'
Lamba	[-mas-i**l**e]	'plaster.PRF'
Herero	[mba-ku**m**b-i**r**e]	'(I) ask.PRF'
Herero	[mbahi■g-i**r**e]	'(I) chase.PRF'

Table 5: Nasal consonant harmony in Lamba and Herero, data from Odden (1994) and Choti (2015)

NCs are analyzed either as singleton complex segments, i.e. prenasalized stops (Hyman 1995) or as nasal-stop clusters (Rose 2004). Distributional evidence suggests that NC segments might have a two-root representation – NC sequence clusters only occur in stem medial positions. They only occur stem-initially when there's a nasal present in the prefix (Piggott 1996; Walker 2000). In other words, NC clusters can be syllabified into two syllables; its neutrality is due to a syllabic-position identity effect (see (Shattuck-Hufnagel 1987) for more discussions of syllabic-position identity effect). In other words, the fact that NC segments skip Bantu nasal harmony process is because the process is onset-driven, and the nasal segment in NC sequences is in the coda position, thus does not participate in the harmony pattern. Ao (1991) argued that NC segments are consonant clusters. The nasality on the first consonant is predictable, and can thus be underspecified, allowing the [+nasal] feature to spread across the whole segment (skipping the whole NC cluster). The underspecification analysis can also account for the non-triggering effect of NCs, aka. NCs do not re-trigger nasalization to their right.

4 An allomorphic analysis

Previous analyses accounted for this nasal harmony pattern with alignment/spreading restrictions on phonological mechanisms, or with underspecification in segments representations. However, some unique characteristics of Bantu nasal harmony have not been addressed. The possibility of an account of the pattern based on phonologically conditioned allomorphy has not been fully explored. An allomorphy analysis states that the alternations in the suffixes that are targeted by nasal harmony could be distinct allomorphs. For example, the perfective suffix /-idi/ in Yaka would have different phonological realizations depending on the phonological context of the preceding stem. It is realized as [-idi] when there is no full nasal in the stem and as [-ini] otherwise.

An allomorphy analysis better accounts for the properties of LDNA and it also predicts opacity as observed in LDNA. First, as Hyman (1995) pointed out, both /d/ and /l/ neutralize to [n] in a structure-preserving way. The fact that this process is sensitive to structural preservation suggests it may not be a purely phonological process. In fact a claim of structure preservation does not *explain* the observed pattern; it merely describes it. Note, a nasalized [l] or a prenasalized [d] are perfectly possible, yet they do not appear in LDNA.

In addition, there's very limited application of this long-distance process cross-linguistically. The vast majority of nasal consonant harmony are reported to be from Bantu languages (Hansson 2010; Rose 2004). Long distance nasal consonant harmony has not been reported in any language outside Bantu. Even within these languages, there are only a couple of well-attested suffixes that are affected by this process. This type of non-local pattern is rare in phonology but is fairly common for allomorphy. We see many cases such as Greek 1st.Sg marking, Bulgarian perfective suffix and so on (see Jurij 2019). The property of non-local interactions would not be adding additional infrastructure to the theory if we shift them to morphology.

Moreover, in most languages, obstruent stops do not nasalize (Durvasula 2009; Walker 2014). However, the Bantu harmony pattern is a case of obstruents harmonizing with a nasal, which is quite unusual typologically speaking. However, it is not surprising if we consider it to be a case of allomorphy. Both the property of structure preservation and the applicability of the phenomenon to a limited set of affixes are readily explained by an allomorphy analysis.

In her dissertation on allomorphy, Paster (2006) surveyed 67 languages and proposed three typologically attested generalization of phonologically conditioned suppletive allomorphy. In this section, I will examine the Bantu nasal agreement pattern against Paster's (2006) and Paster's (2009) generalizations on allomorphy.

4.1 *Generalization 1: Locality* The first generalization outlined in Paster (2014) is that PCSA occurs at the same edge of the stem as the trigger. Specifically, PCSA in prefixes is triggered at the left edge of the stem, while that in suffixes is triggered at the right edge. This generalization is consistent with the data of Bantu nasal harmony because only suffixes are affected by this process and prefixes do not participate in nasal harmony. Therefore, the generalization cannot be falsified in the case of Bantu nasal harmony. Bantu nasal harmony is conditioned by morphological domain constraints. The nasal consonant harmony is limited to the derivational stem (root and its suffixes) and there is no harmony between inflectional prefixes and their bases (Hyman 1995). For example, the /m/ in the prefix 'ma-' does not cause the root-initial /d/ to become [n] as shown in Table 6.

Derivational Suffix	
[**m**ak-i**n**i]	'climb.PRF'
[tsu**m**-i**n**i]	'sew.PRF'
Inflectional Prefix	
[**ma**-**d**afu]	'CL6-palm.wine'
[**ma**-**d**okisi]	'CL6-bruit'

Table 6: Non-application of nasal consonant harmony in Yaka with inflectional prefix, data from Hyman (1995)

It is argued that prefixes do not participate because they are outside the domain of application for nasal harmony (Hyman 1995). However, such a restriction is a description of the pattern and not an explanation. In the allomorphy analysis, this restriction is not necessary.

4.2 *Generalization 2: Opacity* The second generalization for PCSA is that it sensitive to underlying rather than surface forms. As a result, phonological processes may have an ordering effect, and can render opaque conditions for the allomorph distribution. Kidima (1991) pointed out that in Yaka, nasal agreement occurs prior to /N/ prefixation. Prefixing of /N/ can denasalize the root-initial nasal consonants, but the suffix continues to be nasal under such circumstances. As shown with examples in Table 7, the underlying /N/ is a pre-stem prefix nasal segment that alternates according to the morphophonological environment. The root initial nasal first participates in the long distance processes, i.e. nasal consonant agreement and is consequently denasalized.

UR	SR	
[**N**bak-i**d**i]	[m**b**ak-i**d**i]	'(I) catch.PRF'
[**N**luuk-i**d**i]	[n**d**uuki-i**d**i]	'(I) become wise.PRF'
[**N**mak-i**d**i]	[m**b**ak-i**n**i]	'(I) carve.PRF'
[**N**nuuk-i**d**i]	[n**d**uuk-i**n**i]	'(I) sniff.PRF'

Table 7: Nasal agreement with denasalization in Yaka: a case of opacity, data from (Choti 2015), adapted from (Kidima 1991)

For example, The two processes apply in the following order for the word '[nduukini]'('(I) sniff.PRF'). The stem-internal nasals segment /m/ and /n/ trigger nasal agreement and the suffix /d/ surfaces as to [n]. The prefix /N/ subsequently triggers denasalization in the stem-initial nasals, thus changing /m/ and /n/ to [d], rendering the surface form opaque. The opaque pattern suggests an ordering effect of the two rules. A phonological analysis can account for this type of opaque patterns but it does not predict the data one way or another. With an allomorphy analysis, we should expect opacity.

		/N-**n**uuk-i**d**i/
Rule A Nasal agreement	$d \rightarrow n/N\_]_{stem}$	N-**n**uui**n**i
Rule B Prefixation and denasalization	$n \rightarrow d\ /N]_{prefix}\_]_{stem}$	n**d**uuki**n**i
		[nduukini]

Table 8: Ordering between the nasal agreement rule and the denasalization rule, which generates an opaque surface pattern

4.3 *Generalization 3: Non-optimization* The third typological feature for allomorphy is that PCSA is not always optimizing. In numerous examples discussed in Paster (2006), the presence of allomorphs and the order of the distribution of allomorphs do not contribute to the well-formedness of words. In other words, if there were no allomorphy, or if the distribution of allomorphs were reversed, there would not be less violations of any phonological constrains. One could argue that the allomorphs themselves have an optimizing effect on the phonological well-formedness of the words. This character is not applicable in the case of Bantu LDNA, so it will not be further discussed in this paper.

4.4 *A case for allomorphy* This section outlines the reasons based on which Hyman (1995) argued against analyzing the LDNA in Yaka as allomorphy and points out why these reasons are not sufficient to reject an allomorphy analysis. Hyman (1995) first pointed out that an allomorphy analysis would not solve the issue of locality. If we accept the fact that the phonologically conditioning is not arbitrary, we need to account for the allomorphy selection process. In other words, I still have to answer the question: what is the relationship between the 'conditioned' allomorph and the elsewhere case? I agree that a more thorough analysis of the specificity of Bantu allomorphs is needed. However, it is worth pointing out that this is not a problem unique to an allomorphy analysis, but it also applies to a phonological analysis if it were to *explain*, not just account for, why Bantu has nasal harmony. If the the process is analyzed as a result of an arbitrary rule/constraint ranking, then it can also be explained as arbitrary allomorphy.

Second, Hyman argued that the fact that nasal agreement in Yaka not only applies to the perfective suffix and the applicative suffix but also potentially to other suffixes, which suggests a phonological account. The examples in Table 9 include the intransitive reversive suffix /-uk-/ and transitive reversive suffix /-ud-/ in Yaka. The latter (/-ud-/) is nasalized as [-un-] when there is a full nasal in the stem.

Intransitive reversive suffix		**transitive reversive suffix**	
[bal-uk-]	'be knocked down.INTR.REVS'	[bad-ud-]	'overthrow.TRNSL.REVS'
[dob-uk-]	'go out.INTR.REVS'	[dob-ud-]	'evacuate.TRNSL.REVS'
[haamb-uk-]	'part.INTR.REVS'	[haamb-ud-]	'set apart/separate.TRNSL.REVS'
[huung-uk-]	'be brought back.INTR.REVS'	[huung-ud-]	'bring back.TRNSL.REVS'
[ho**n**-uk-]	'fall.INTR.REVS'	[ho**n**-u**n**-]	'drop.TRNSL.REVS'
[su**n**-uk-]	'knot.INTR.REVS'	[su**n**-u**n**-]	'untie knot.TRNSL.REVS'
[**n**ik-]	'grind.INTR.REVS'	[**n**ik-u**n**-]	'stir/wipe/erase.TRNSL.REVS'
[**n**ut-uk-][*nut-]	'bow.INTR.REVS'	[**n**ut-u**n**-]	'push.TRNSL.REVS'

Table 9: Nasal harmony of the intransitive reversive suffix /-uk-/ and transitive reversive suffix /-ud-/ in Yaka, data adapted from Hyman (1995) and Ruttenberg (1971)

Hyman also pointed out that no attested nasal counterpart is found for the suffix /-udud-/ in Yaka from CBOLD ("1997-2003") (as shown in Table 10) although we expect /-unun-/ to surface when the preceding stem contains a full nasal. However, in a related language Lamba, we do find that /l/ in the suffix is nasalized as [n] as shown in Table 11.

Action		**Repeated action**	
[beet-]	'strike'	[-fis-ulul-a]	'strike again.REP'
[hang-]	'make'	[hang-udud-]	'remake.REP'

Table 10: Nasal harmony of the repeated action suffix /-udud-/ in Yaka, data from Ruttenberg (1971)

Intransitive reversive suffix		**Transitive reversive suffix**	
[-fis-uluk-a]	'get revealed.INTR.REVS'	[-fis-ulul-a]	'reveal.TRNSL.REVS'
[-mi**n**-u**n**uk-a]	'get unswallowed .INTR.REVS'	[-mi**n**-u**n**u**n**-a]	'unswallow.TRNSL.REVS'
[-mas-uluk-a]	'get unplastered.INTR.REVS'	[-mas-ulul-a]	'unplaster.TRNSL.REVS'

Table 11: Nasal harmony of the intransitive reversive suffix /-uluk-/ and transitive reversive suffix /-ulul-/ in Lamba, data from Odden (1994)

I argue that the cases presented in Hyman (1995) are found wanting and do not provide conclusive evidence to support that nasal agreement is a phonological process given the attested suffixes are rather limited. More data is needed to argue for a general systematic nasal agreement pattern in Bantu languages. The limited application of the alternation between a voiced consonant and nasal (the fact that we have also observed alternation with /d/ or /l/ thus far) suggests it may not be an active phonological process.

5 Conclusion

This paper explored the issue of long distance nasal harmony in a number of Bantu languages. LDNA has been previously analyzed as a case of consonant harmony. This paper explored the possibility for a phonologically conditioned suppletive allomorphy analysis by examining a number of languages with nasal agreement between a full nasal in the stem and a voiced consonant in the suffix. An allomorphy analysis of LDNA simplifies phonology proper by shifting non-local "harmony" processes to morphology. It is consistent with the limited application of this pattern (only a few suffixes) and accounts for the structural-preserving and long-distance properties of LDNA. Crucially, the theory makes better predictions. It not only account for but predicts opacity of a specific kind. It provides further evidence for the possibility of imposing constrains on the effects of rules that operate at a distance.

References

Anderson, Stephen (1975). "On the interaction of phonological rules of various types". In: *Journal of Linguistics* 11.1, pp. 39–62.
Ao, Benjamin (1991). "Kikongo nasal harmony and context-sensitive underspecification". In: *Linguistic inquiry* 22.1, pp. 193–196.
Archangeli, Diana & Douglas Pulleyblank (1986). "Maximal and minimal rules: Effects of tier scansion". In: *North East Linguistics Society* 17.1, p. 3.
Booysen, Jacobus Mattheus (1982). *Otjiherero:'n Volledige Grammatika met Pefeninge en Sleutels in Afrikaans*. Gamsberg.
CBOLD. "1997-2003". In: *Comparative Bantu Online Dictionary*. URL: `http://www.cbold.ish-lyon.cnrs.fr/` (visited on 05/03/2021).
Chomsky, Noam & Morris Halle (1968). *The Sound Pattern of English*. ERIC.
Choti, Jonathan Nyabuto (2015). *Phonological (a) Symmetries of Nasal Prefixes in Bantu*. Ph.D. dissertation, Michigan State University.
Collins, Bernard (1962). *Tonga Grammar*. Longmans.
Durvasula, Karthik (2009). *Understanding Nasality*. Ph.D dissertation, University of Delaware.
Eynde, Karel Van den (1968). *Éléments de Grammaire Yaka: Phonologie et Morphologie Flexionnelle*. Vol. 13. Université Lovanium.
Greenberg, Joseph (1951). "Vowel and nasal harmony in Bantu languages". In: *Revue Congolaise* 8, pp. 813–820.
Hansson, Gunnar Ólafur (2010). *Consonant Harmony: Long-distance Interactions in Phonology*. University of California Press.
Hyman, Larry (1982). "The representation of nasality". In: *The Structure of Phonological Representations, Part 1*. Ed. by Harry van der Hulst & Norval Smith. De Gruyter Mouton, pp. 111–130.
— (1995). "Nasal consonant harmony at a distance the case of Yaka". In: *Studies in African Linguistics* 24.1, pp. 6–30.
— (1998). "Positional prominence and the 'prosodic trough' in Yaka". In: *Phonology* 15.1, pp. 41–75.
Kidima, Lukowa (1991). *Tone and Accent in Kiyaka*. Ph.D. dissertation. University of California, Los Angeles.
Kula, Nancy Chongo (2002). *The Phonology of Verbal Derivation in Bemba*. Ph.D. dissertation. Leiden University.
Maddieson, Ian & Bonny Sands (2019). "The sounds of the Bantu languages". In: *The Bantu Languages, 2nd edition*. Ed. by Derek Nurse & Gérard Philippson Mark Van de Velde Koen Bostoen. Routledge London, pp. 79–127.

Meinhof, Werner (1932). “Bodenständige Kunst”. In: *Special issue for the Niedersachsentag, Das Oldenburger Programm mit Beiträgen zur Heimatgestaltung*, pp. 19–22.
Nevins, Andrew (2010). *Locality in Vowel Harmony*. MIT Press.
Odden, David (1994). “Adjacency parameters in phonology”. In: *Language* 70.2, pp. 289–330.
— (2015). “Bantu phonology”. In: *Oxford Handbooks Online*, pp. 1–49.
Paster, Mary (2006). *Phonological Conditions on Affixation*. Ph.D. dissertation. University of California, Berkeley.
— (2009). “Explaining phonological conditions on affixation: Evidence from suppletive allomorphy and affix ordering”. In: *Word Structure* 2.1, pp. 18–37.
— (2014). “Allomorphy”. In: *The Oxford Handbook of Derivational Morphology*. Ed. by Rochelle Lieber & Pavol Štekauer, pp. 219–234.
Peng, Long (2000). “Nasal harmony in three South American languages”. In: *International journal of American linguistics* 66.1, pp. 76–97.
Piggott, Glyne (1987). “On the autonomy of the feature nasal”. In: *CLS* 23.2, pp. 223–238.
— (1996). “Implications of consonant nasalization for a theory of harmony”. In: *Canadian Journal of Linguistics/Revue Canadienne de Linguistique* 41.2, pp. 141–174.
Pulleyblank, Doug (1989). “Patterns of feature cooccurrence: The case of nasality”. In: *Arizona Phonology Conference Vol.2*, pp. 98–115.
Reiss, Charles & Frédéric Mailhot (2007). “Computing long-distance dependencies in vowel harmony”. In: *Biolinguistics* 1, pp. 28–48.
Rose, Sharon & Rachel Walker (2004). “A typology of consonant agreement as correspondence”. In: *Language* 80.3, pp. 475–531.
Ruttenberg, Piet (1971). *Lexique Yaka-Français*. München: Lincom Europa.
Shattuck-Hufnagel, Stefanie (1987). “The role of word-onset consonants in speech production planning: New evidence from speech error patterns”. In: *Motor and Sensory Processes of Language*. Ed. by Eric Keller & Myrna Gopnik. Lawrence Erlbaum Associates, Inc, pp. 17–51.
Walker, Rachel (2000). “Yaka nasal harmony: Spreading or segmental correspondence?” In: *Annual Meeting of the Berkeley Linguistics Society* 26.1, pp. 321–332.
— (2011). “Nasal harmony”. In: *The Blackwell Companion to Phonology, Vol. 3*. Ed. by Elizabeth Hume & Karen Rice Marc van Oostendorp Colin Ewen, pp. 1838–1866.
— (2014). *Nasalization, Neutral Segments and Opacity Effects*. Routledge.