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► To cite this version:

Cédric Patin, Annie Rialland. On the nature of rules sensitive to syntax: the case of Makonde tonology. Prosody and Syntax - Cross-Linguistics Perspectives, John Benjamins Publishing Company, pp.285-302, 2006. halshs-00129274

HAL Id: halshs-00129274

<https://shs.hal.science/halshs-00129274>

Submitted on 6 Mar 2007

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On the nature of rules sensitive to syntax :

the case of Makonde tonology

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1. Introduction

In the past thirty years, there has been a debate over the nature of the phonology-syntax interface¹. The most extreme views (and the most strongly antagonistic) can be dubbed the *Indirect Reference Theory* and the *Direct Reference Theory*². The Indirect Reference Theory³ (IRT) assumes that phonology cannot access syntactic information directly, only indirectly, through intermediate structures (typically given by the *Prosodic Hierarchy*). The main arguments supporting this approach are drawn from mismatches observed between syntactic and prosodic structures, such as the Chaga⁴ example below:

- (1) [NP leeri [CP [NP Prayanyi] [VP aleenenga [NP Ladi]]]] (Mc Hugh, 1990 p. 403)
- (lèérì Prà'ányí) ò (àlèénèngà Làdì) ò
- money Brian gave Ladi
- The money Brian gave to Ladi*

It can be remarked, in this example, that prosodic phrases (indicated by the symbol ò) do not coincide with groupings originating directly in the syntactic structures : the first phonological phrase ends at the end of the subject , i.e. midway through the relative clause.

The opposite view, the Direct Reference Theory⁵ (DRT), assumes that phonology can have direct access to syntax. One of the main arguments in favor of DRT is the existence of

¹ In this article, the expression "syntax-phonology interface" refers to the interface between syntax and phonology, as characterized by a set of phonological rules limited to syntactic contexts. The cases in which syntax phenomena are affected by phonological rules (cf. Kager & Zonneveld 1999 for an overview) will not be considered.

² For a general reminder of the evolution of this debate, see Inkelas & Zec 1995, Kager & Zonneveld 1999...

³ Selkirk 1986, Nespor & Vogel 1986, Truckenbrodt 1999, among others...

⁴ Bantu, Tanzania ; Mc Hugh 1990

⁵ Kaisse 1990, Odden 1987, 1990c, 2000 among others...

numerous rules, occurring generally inside nominal phrases, which refer to specific grammatical categories or syntactic constructions. Thus, in Shi⁶, for example, the last tone of a noun ending with a ...BH sequence is deleted when the noun precedes a directly governed element. The following examples are taken from Philippson 1991, p. 314-5:

- (2) oómwaaná mútoo → óómwaana mútoo *a little child*
[child – little]
- (3) bálumé ná-bákazi → bálume ná**á**kazi *men and women*
[men – and-women]
- (4) aábálumé basúnikaga → aábálume basúnikaga *people who push*
[people – who push]

The limitation of this rule to the lexical category “nominal” cannot be accounted for in the IRT framework. This type of rules is not exceptional: in Ewe⁷, a high tone verb exhibits a rising tone followed by a rising or high tone, if the root of the following noun has a mid or a high tone on its first syllable and in Hausa⁸, a long final syllable of a verb is shortened before an object noun phrase.

The case of Runyankore⁹ provides an especially illuminating illustration of the issues raised by these rules. In his Ph. D. thesis, Poletto argued that an IRT approach, more specifically the End-Based Theory¹⁰, provides a simple and straightforward account of the following rule: a high tone is inserted at the end of a low-tone lexeme if it is followed by a low-tone word in the same phrase.

- (5) enkaito *shoe* (Poletto 1998, p.263)
enkaitó nuunji *good shoe*
- (6) omuuntu *person*
omuuntú muruunji *good person*

As expected, this rule does not apply in the following example (7):

⁶ Bantu, Democratic Republic of Congo; Philippson 1991

⁷ Gbe, Ghana and Togo; Clements 1978

⁸ Tchadic, Nigeria; Hayes 1990

⁹ Bantu, Uganda; Poletto 1998

¹⁰ Selkirk 1986: in this model, which is a variant of Clements's IRT model (Clements 1978), prosodic phrases are built on the basis of syntactic structures, by grouping into a single phrase all the words up to a X_{max} constituent (NP, VP...). This model is particularly constrained as a single type of syntactic information is available: the limit of X-bar constituents (phonology cannot access to the syntactic relationship such as: head/complement, complement versus adjunction, domination, c-command, etc...). According to Selkirk, the alignment of phonological phrases on the left or on the right boundary of a X_{max} constituent is language dependent. We will not here reproduce Poletto's analysis but we will follow his conclusions.

- (7) omuuntu mugúfu *short person*

Crucially, Poletto shows that this rule can be treated within the IRT framework and not in the DRT theory, especially because examples, such as the following, are problematic for the DRT :

- (8) akareeba kagoma y' ómwáana (Poletto 1998, p. 324)
he saw eagle of farmer

.....]X-MAX
(.....)₀

He saw the eagle of the farmer

- (9) akareebá kagoma na mareére
he saw eagle and hawk

.....]X-MAX]X-MAX
(.....)₀ (.....)₀

He saw an eagle and a hawk

The relationship between the verb and the complement being similar in both examples, the DRT would not be able to account for the occurrence of a high tone in the second utterance. There is a rule in Runyankore, however, belonging to the set of rules sensitive to specific grammatical categories or specific phrases mentioned previously, which, according to Poletto, could only be accounted for in the DRT: “a noun loses his high tone when it is followed by certain types of directly governed high tone determinants”:

- (10) enkóko *chicken* (Poletto 1998, p. 260)

enkoko yaábo *their chicken*

but the rule does not apply in :

- (11) enkóko yaanje *my chicken*

Thus, we end up with the following situation in Runyankore: one of the rules receives an adequate treatment within the DRT but not within the IRT. On the contrary, another one can be treated by the IRT approach but not by the DRT.

Thus, the treatment of rules referring to grammatical categories or specific phrases is problematic¹¹. In this paper, we will examine several rules of this type, occurring within nominal phrases in four dialects of Makonde, a Bantu language from East Africa: Simakonde [SIM], a dialect spoken by Makonde people who emigrated on the Zanzibar Island and in Tanga (Western Tanzania) – using data from Manus 2003 ; Shimakonde [SHI], spoken in

¹¹ The problems triggered by these rules have been partially solved in the IRT framework when Hayes proposed the *Precompilation Theory* (Hayes 1990). In this model, the rules referring to the lexical elements are « precompiled », as they operate of the lexical level and not at the postlexical one. Several allomorphs are derived. At the interface syntax/phrasal phonology, the appropriate morphemes will be introduced in the

Mozambique – using data from Liphola 2001; Mahuta [MHT] and Maraba [MRB], the two other dialects, are spoken in the South of Tanzania and seem strongly influenced by Swahili – the data are taken from Odden 1990a and Odden 1990b respectively.

Studying these rules and their variations across these four dialects, we will propose that they originate in from phonological rules through analogy processes. In fact, due to the role of analogy, these rules are not phonological rules which intervene in specific syntactic environments. We will conclude that they have to be treated in morphology and not as part of the phonology-syntax interface. From a theoretical point of view, our research illustrates the power of analogy as a means to separate rules that do belong to the phonology-syntax interface from those that do not, and to characterise these rules and processes. We thus aim to contribute to a more precise definition of the phonology-syntax interface, diminishing the number of problematic cases.

We will first consider, in four dialects of Makonde, syntax-sensitive tone rules occurring inside nominal phrases, which are usually considered as belonging to the phonology-syntax interface (part 2). Then we will argue for an analogical origin of these rules, which implies that they are morphological and not phonological (part 3). Our conclusion will elaborate on the nature of analogy and its use as a criteria to tell apart processes that belong to the syntax-phonology interface from those that belong to morphology.

2 Tone rules in various Makonde dialects

This part will be devoted to the examination of tone rules applying in noun phrases. Our analysis will proceed depending upon noun phrase types, in the following order :

- Noun + demonstrative
- Noun + possessive
- Noun + interrogative
- Noun + other determinants

2.1. Noun+Demonstrative

adequate syntactic contexts. However, the model, while being elegant, cannot account for some situations. (cf. critical comments by Odden 1990c et Kaisse 1990).

When a Makonde noun is followed by a demonstrative, its last two syllables receive a high tone. This rule occurs in the following dialects: Mahuta, Maraba and Shimakonde, as illustrated by the following examples :

- (12) nankatataambwe « spider »
 nankatatámbwé yúunó « this spider »¹² [MRB, Odden 1990b, p. 92]
- (13) likuungwa « drum »
 likúngwá líino « that drum » [MHT, Odden 1990a, p. 176]

The Shimakonde demonstratives studied by Liphola, all of them being far demonstrative, begin with a vowel. Segmental processes, particularly the drop of the last vowel of the noun, tend to obscure the two high tone assignment rule which, nevertheless, was identified by Liphola. The following Shimakonde forms exemplify this process:

- (14) lindandoosha « ghost »
 lindandósh' ááli « this ghost » [SHI, Liphola 2001, p. 394]
 <lindandósh (á) ááli

In Simakonde, the rules are different. In a noun phrase with a demonstrative, the noun, whatever its lexical tones, is totally high:

- (15) ipooso « gift »
 ípósó aailá « that gift »¹³ [SIM, Manus 2003, p. 304]

Summary

	SIMAKONDE	SHIMAKONDE	MARABA	MAHUTA
N (preceding a Dem)	c'vc'vc'v	cvcvc'vc'v	cvcvc'vc'v	cvcvc'vc'v

¹² Makonde presents a regular lengthening of the penultimate syllable, which is the accented syllable. In some syntactic situations, which vary depending upon the dialects, the lengthening will not occur.

¹³ Manus's examples in her thesis are essentially nouns with disyllabic roots, few of them being based on a trisyllabic root. On the contrary, Odden and Liphola's studies present mainly examples involving roots with three syllables.

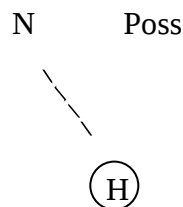
2.2. Noun+Possessive

The rules concerning noun+possessive phrases vary depending upon the dialects and the lexical tones of the noun.

In Maraba, a noun loses its lexical tones and is assigned a high tone on its last syllable:

- (16) chitélééko « cooking pot »
chiteleló cheetu « our cooking pot » [MRB, Odden 1990b, p. 89]

The high tone of the last syllable can be analysed, according to Odden, as a floating tone which is introduced as part of the possessive marker.



This floating high tone has been found regularly in all the dialects of Makonde and was posited in all analysis of these dialects. In Maraba, it triggers the deletion of the lexical tones of all the complements which might occur between the nominal and the possessive (ex : *N Adj Adj Poss*)...

In Mahuta, the rules are more complex, depending upon the lexical tones of the noun.

a) Low tone noun +possessive

An entirely low tone noun, when followed by a possessive, exhibits, as expected, the floating high tone on its last syllable :

- (17) nankakataambwe « spider »
nankakatambwé waangu « my spider » [MHT, Odden 1990a, p. 175]

b) Noun with a high tone on the penult syllable +possessive

A noun with a lexical high tone on the penultimate syllable, will surface with the floating high tone on its last syllable and no other high tones.

- (18) chiláámbo « world »
chilambó chaake « his world » [MHT, Odden 1990a, p. 175]

Odden assumes a rule deleting the first tone in a sequence of two high tones within a noun phrase with a possessive. This rule is ordered after the association of the floating high tone.

Step 1 : chilámbo ´chaake

Step 2 : chilámbó chaake

Step 3 : chilambó chaake

The reader might wonder why Odden proposes this specific rule, while a more general rule deleting all the lexical tones, as in the analysis of noun phrases with possessive in Maraba, might have been suggested ? The *raison d'être* of this rule is the coherence with other data, such as the following:

c) Noun with one or more high tones + possessive

In this case, a tonal «bridge » (an uninterrupted sequence of high tones) links the lexical tone(s) and the floating tone of the last syllables:

(19) litíkiiti « watermelon »

litíkítí lyaangu « my watermelon » [MHT, Odden 1990a, p. 175]

Step 1: litíkiti ´lyaangu

Step 2: litíkítí lyaangu

Step 3: litíkítí lyaangu

Thus, Mahuta data can be accounted for without any reference to syntax, as they involve only phonological rules (OCP, tonal “bridges” formation). In Maraba a rule such as « deletion of the noun lexical tones in noun phrase with possessive » is syntax sensitive and operates within the phonology-syntax interface. We will come back later on these rules while discussing the nature of syntax sensitive rules in Makonde noun phrases (cf. 3).

The Shimakonde data is quite interesting as it involves additional complexity. At first glance, Shimakonde behaves globally as Mahuta:

(20) nakatataambwe « spider »

nakatatambwé waángu « my spider » [SHI, Liphola 2001, p. 393]

(21) shidangadoóngo « Adam's apple »

shidangadongó shaáke « his Adam's apple » [SHI, Liphola 2001, p. 393]

(22) lípángápáánga « sp. cactus »

lípángápángá lyaáke « his cactus » [SHI, Liphola 2001, p. 370]

Liphola does not propose the same rules as Odden and does not suggest a deletion of the lexical tones. In fact, he introduces additional data, involving a free variation in the noun tones. A noun in phrases with possessive may end with high tones on its two final syllables as in noun phrases with demonstrative, which is illustrated by the following examples:

- (23) nakatataambwe « spider »
 nakatatambwé waángu « my spider»
 nakatatámbwé wáake « his spider » [SHI, Liphola 2001, p. 372]

- (24) shindangadoóngo « Adam's apple »
 shindangadongó shaáke « his Adam's apple »
 shindangadóngó sháake « his Adam's apple » [SHI, Liphola 2001, p. 383]

But a noun in the same context may also be totally high:

- (25) lípángápáánga « sp. cactus »
 lípángápángá lyaáake « his sp. cactus »
 lípángápángá lyáake « his sp. cactus » [SHI, Liphola 2001, p. 385]

The speaker can use freely either one or the other form.

Simakonde behaves differently from the other dialects. As Shimakonde, it has a free variation between two forms. In the first form, the lexical noun tones are not modified.

- (26) lyúúla « watermelon»
 lyúúla lyáangu « my watermelon» [SIM, Manus 2003, p. 295]

We can notice that there is no reduction of the vowel length and that the possessive floating high tone is not carried by the last syllable of the noun. These two facts are related and can be explained by a mapping of the possessive phrase within two phonological phrases (Manus says “distinct prosodic groups”):

(N)₀ (Poss)₀

In the second form, the floating high tone reappears:

- (27) lyúlá lyáangu « my watermelon» [SIM, Manus 2003, p. 310]

There is a reduction of the vowel length AND the floating tone present: the two terms belong to the same phonological phrase (Manus says “single prosodic group”).

(N Poss)₀

The lexical tones are not modified.

Recapitulative tables

	SHIMAKONDE		MAHUTA	MARABA
cvcvcvvcv	cvcvc'c'	cvcvcvc'	cvcvcvc'	cvcvcvc'
cvcvc'vcv	cvcvc'c'	cvcvcvc'	cvcvcvc'	cvcvcvc'
cvc'cvcv	cvcvc'c'	cvc'cvc'	cvc'cvc'	cvcvcvc'

	SIMAKONDE	
	<i>2 phonological phrases</i>	<i>1 phonological phrase</i>
cvcvvcv	cvcvvcv	cvcvc'
cvc'vcv	c'c'vcv	c'cvc'

2.3. Noun phrases with interrogative

There is an interesting phenomenon in Makonde: deletion of the lexical nominal tones occurs in interrogative phrases with the interrogative marker *-aani*.

This is attested in Mahuta:

- (28) *chikáápu* « basket »
chikapu *ńtaani* « what type of basket? » [MHT, Odden 1990a, p. 178]

It has to be emphasised that this tone deletion does not occur with other interrogative markers:

- (29) *chikápu* *chilíída* « which basket? »
vikápu *vingáápi* « how many baskets? » [MHT, Odden 1990a, p.178]

Similarly, in Shimakonde, the lexical tones of the noun are not deleted but a floating high tone is associated to the last syllable, as in noun phrases with a possessive.

- (30) *lípángápáánga* « cactus »
lipangapangá *shaáni* « which¹⁴ cactus ? » [SHI, Liphola 2001, p. 373]

In Simakonde, the floating high tone is present but there is no deletion of the noun lexical tones! The noun behaves similarly in an interrogative noun phrase with *-saani* and in a possessive phrase.

- (31) *lyúúla* « watermelon »
lyúlá *saáni* « which watermelon »
lyúlá *lyaángu* « my watermelon » [SIM, Manus 2003, p. 310]

The Maraba case is interesting. Thus, in this dialect, there is a deletion of the lexical tones of the noun and a lack of floating high tone but tone deletion occurs in noun phrases with various interrogative morphemes:

- (32) *chitélééko* « cooking pot »
viteleko *vingáapi* « how many cooking pots? »
chiteleko *chanaáni* « whose cooking pot? » [MRB, Odden 1990b, p. 88]
- (33) *litíkíiti* « watermelon »
litikiti *gáani* « what type of watermelon? » [MRB, Odden 1990b, p. 88]

However, this tone deletion is not found in interrogative phrases with *-liida*.

¹⁴ The meaning of *-aani* is not the same in Odden and Liphola

(34) chitéléko chilíída « which cooking pot? » [MRB, Odden 1990b, p. 88]

2.4. Other nominal phrases (noun+other determinants)

Let's consider phrases with other determinants. No specific rules apply to these phrases in Mahuta or Simakonde. On the contrary, Maraba and Shimakonde dialects have interesting processes.

In Maraba, the noun exhibits a high tone on its penultimate syllable before a variety of determinants:

(35) nankatataambwe « spider »
 nankatatámbwe véengi « many spiders »
 nankatatámbwe vóóe « all the spiders » [MRB, Odden 1990b, p. 91]

(36) limbeende « skin »
 limbénde likúlu « large skin »
 mambénde mǎnne « four skins » [MRB, Odden 1990b, p. 92]

In Shimakonde, the same rule is found, with a special feature: the two last syllables (and not only the last one), exhibit a high tone.

(37) nakatataambwe « spider »
 nakatatámbwé ngúlúguuma « round spider »
 nakatatámbwé nántaándi « the first spider »
 nakatatámbwé áshítúkúúta « the spider which was running »
 [SHI, Liphola 2001, p. 394-6]

Note that, optionally, a noun is realised totally high when preceding an adjective in adjective noun phrases.

3 Integrating analogy into the analysis

Currently, analogy is used only with parcimony¹⁵, by a small number of linguists. This concept, which has long been attractive, has come under criticism – as many others – for being too powerful. In fact, analogy could be overused and it may be tempting to apply it to any type of process, without limitations.

¹⁵ Outside of diachrony studies, analogy is almost exclusively used to account for data observed in the domain of language acquisition, to explain some of the children's « mistakes » (such as **si j'aurais su* in French).

Moreover, if analogy is sometimes considered as worthless because it « explains everything », other authors consider that linguistics does not explain analogy. According to these authors, we can only observe the effects of analogy, while the « motivations » for analogy processes seem « extra-grammatical ». Lass summarises clearly this view:

« I agree that for instance analogical levelling is very common (in my experience of language histories) ; but neither I nor anybody else knows *how* common, or can say safely how ‘representative’ our experience is. Given an initially undefined and undelimited corpus, each additional corroboration is meaningless if one doesn’t know how many negative instances are lurking out there. If every case of analogy (or movement in the ‘right’ direction along a grammaticalization cline, or whatever) not happening ‘doesn’t count’, then analogy or whatever is an uninterpreted category, not a ‘principle’, and surely nothing explanatory or even usefully exegetical »¹⁶

In other words: if we cannot predict why analogy occurs in some cases and not in others, and if we cannot predict the contexts of its occurrence, analogy cannot be used as an explanatory concept.

However, if this argumentation is relevant, it seems too extreme. Interesting attempts are currently made to determine the conditions in which analogy can be used in linguistics. One of the strong predictions of the *Optimal Paradigms* model¹⁷ proposed by McCarthy is the avoidance of analogical levelling when it might trigger a violation of a constraint ranked higher in the hierarchy¹⁸. We could also mention Albright’s works¹⁹, which show the tendency for the analogy to select, as base forms, forms which keep contrasts²⁰ optimally. Note that Lass’s argumentation was mainly directed against the view of analogy as « universal » and/or « natural », which is not part of our concerns in this article.

At last, the possibility of using analogy is limited by diachronical or transdialectal data, which is scarce for many African languages. Despite these limitations, an approach integrating analogy has many advantages.

Firstly, it allows for a better characterisation of the rules of phonology-syntax interface, versus rules which are not part of this interface. Analogy can be considered as

¹⁶ Lass 1997

¹⁷ McCarthy 2005

¹⁸ An analysis that opponents to the Optimality Theory might consider as *ad hoc* and/or circular.

¹⁹ Albright in prep.

²⁰ Albright 2002a

« d'ordre grammatical » (meaning that it is not phonetic or phonological), according to Saussure:

« L'analogie est d'ordre grammatical : elle suppose la conscience et la compréhension d'un rapport unissant les formes entre elles. Tandis que l'idée n'est rien dans le phénomène phonétique, son intervention est nécessaire en matière d'analogie »²¹

Thus, analogy does not refer to phonology, at least not necessarily. To quote Saussure again: « C'est d'elle que relèvent toutes les modifications normales de l'aspect extérieur des mots qui ne sont pas de nature phonétique²² ». This view is largely accepted, since the Neogrammarians, witness the following quotations, by Lass and Sweet respectively:

« One of the worst problems for the morphological historian is of course analogy, where regular, expected [...] phonological developments are interfered with by non-phonological processes »²³

« [Analogy] is not a phonetic change at all, but rather a substitution... by analogy »²⁴

Interestingly, the analogical approach provides an explanation for the fact that these rules have exceptions (proper nouns, loan words, etc...) without introducing « lexical » models (Precompilation Theory, Lexical Sandhi Theory²⁵, etc...).

At last, it can explain specific cases which cannot be accounted for by other models. Therefore, let's observe a Kinyambo²⁶ rule presented by Bickmore:

*The high tone of a word causes the deletion of the last high of the preceding word*²⁷

- (38) abakózi « workers »
 bákakóma « they tied »
 abakozi bákakóma « workers tied »

Curiously, this rule is sensitive to the number of syllables between the two tones in question:

- The two tones are on two successive syllables = the rule is obligatory
- The tones are separated by one to three syllables = the rule is optional

²¹ Saussure, *ibid.*, p. 226

²² We're underlying

²³ Lass 1997

²⁴ Sweet 1900

²⁵ An alternative model to Precompilation Theory, proposed by Odden 1990c

²⁶ Bantu, Tanzania

²⁷ Bickmore 1989 ; the rule is somewhat simplified, for clarity

- The tones are separated by four syllables = the rule cannot apply

(39) kókushubira ná kagemuro « Kokushubira and Kagemuro »

(*kokushubira...)

None of the phonology-syntax interface models can explain this phenomenon.. We propose – with precautions due to absence of diachronic data – that the optionality of the rule (when one to three syllables separate the two tones) signals an analogical process, originating in forms with contiguous tones (which undergo a classical rule motivated by the Obligatory Contour Principle).

5. Conclusion

The Makonde data analysed in this article argue in favor of an analogical origin of some rules usually considered as phonology-syntax rules. Of course, further research would be necessary to better delimit the role of analogy in the formation of these rules, especially when they occur in noun phrases. As analogy excludes any role played by phonology, the rules presented in the first part have to be considered as « simple » morphosyntactic rules. The tone rules that we studied in this article can be related to such phenomena as consonantal mutations²⁸ in Celtic languages which have clearly a phonological origin but which are clearly morphological in the current state of these languages.

²⁸ We refer to Green's work (ROA ???), which compares two types of lenition in *manx*: one being analyzed as morphological and the second one as phonological. The phonological lenition, which is optional, concerns obstruents between two vowels word-internally. This rule is independant from morphosyntactic contexts.

The morphological lenition intervenes in particular contexts : feminine nouns after definite article, nouns after some possessive, some numerals, some prepositions, dative nouns after article, adjective after singular feminine nouns, past verbs, etc...

The two types of lenition differ also in a way which strengthens remarkably Green's argumentation. Thus, the phonological lenition triggers expected surface forms, as the following ones :

Input	p	t	k	b	d	g	s	x
Output	b~v	d~ð	g~ɣ	v	ð	ɣ	ð, z	ɣ~h~ø

On the contrary, after the application of the morphological deletion, the phonemes are not those expected in a usual lenition process :

Input	p	t, t ^j	k, k ^j	b	d, d ^j	g, g ^j	s, s ^j	m
Output	f	h~x, h~x ^j	h~x, h~x ^j	w~v	ɣ, j	ɣ, j	h, h~x ^j	w~v

These two types of rules – the phonological deletion and the morphological deletion - can be compared to the rules of **Makonde** presented in this paper. The Mahuta rules involving a nominal and a demonstrative - which are phonological - would be the counterpart of the phonological deletion while the Maraba rule –which is morphological- would correspond to *the morphological deletion*.

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