

# Sociolinguistic effects in consonant prevocalization in Maxakalí

Mário André Coelho da Silva

UFMG / VU Amsterdam

Maxakalí is a Macro-Jê language, from the Maxakalí family, spoken by about 2000 people in Mucuri River Valley, Minas Gerais, Brazil. One phenomenon regarding its phonology is the prevocalization of all its consonants when in coda position. Although common in world languages (Operstein 2010), prevocalization usually applies in liquid consonants, but as Maxakalí has neither rhotics nor laterals, this becomes a typologically interesting fact. Another thing about the lenition of consonants in Maxakalí is that one same speaker may vary between a complete consonantal realization up to a complete vocalic allophone of coda, forming a continuum. By collecting data from 18 subjects from one Maxakalí village, stratified for both age and gender, we were able to verify to which extent these two factors were active in this variation. It seems that both factors are, in fact, statistically relevant for this variation. On the one hand, age reveals that it is a variation in apparent time – added to 19th and 20th centuries historical wordlists, it seems that this is a change in progress. On the other hand, gender reveals us, at least partially, that the configuration of the Maxakalí society and the different gender functions are reflected in each gender's speech.

**Keywords:** indigenous languages; Maxakalí; phonology; prevocalization; sociolinguistics

## 1. Introduction

Maxakalí is the only extant language from the Maxakalí family, from the Macro-Jê stock, spoken by about 2000 people divided in four villages, all of them located in Mucuri River Valley, northeastern Minas Gerais, Brazil. The Maxakalí people is in contact with the non-indigenous culture at least since 1734 (Nimuendajú 1958) and most of them still retain their language and traditional religious beliefs. This paper is based on part of the results of my Master's De-

gree Thesis about prevocalization of consonants in Maxakalí with some new observations.

Composed by ten vowels (five orals and five nasals), two laryngeals and eight consonants (four unvoiced stops and four nasal~voiced stops)<sup>1</sup>, as shown in Tables 1 and 2 respectively, the language has a rich phonological system. Its phenomena involve, for example, nasal spreading, alternation between nasal and voiced consonants and consonantal prevocalization. Although the latter is common in world languages (Operstein 2010), Maxakalí is exceptional, given that all of its consonants may become prevocalized in coda position, either in medial or final positions.

**Table 1.** Maxakalí phonological vowel inventory

	Front		Central		Back	
<b>High</b>	/i/	/ĩ/	/i/	/ĩ/		
<b>Non-High</b>	/e/	/ẽ/	/a/	/ã/	/o/	/õ/

**Table 2.** Maxakalí phonological consonants and laryngeals inventory

	Labial	Dental	Palatal	Velar	Laryngeal
<b>Unvoiced stop</b>	/p/	/t/	/c/	/k/	/ʔ/
<b>Nasal ~ voiced stop</b>	/m ~ b/	/n ~ d/	/ɲ ~ ʝ/	/ŋ ~ g/	
<b>Fricative</b>					/h/

Consonantal prevocalization is typologically common in liquids (cf. Brazilian Portuguese /l/ → [w], Serbo-Croatian /l/ → [o], in coda position in both languages. For a comprehensive list see the Appendix 2 of Operstein 2010), but as Maxakalí does not have neither rhotics nor laterals in its inventory, this fact becomes interesting enough to deserve a closer look.

Operstein (2010) bases her analysis of prevocalization in an Articulatory Phonology framework, arguing that every consonant has a Vowel Tier (V-Tier) in addition to the Consonantal Tier (C-Tier). It is also argued that plain consonants have a total overlap between C-Tier and V-Tier and that the V-Tier has the same place of articulation of the C-Tier. Consonants with secondary articulation have different places for C-Tier and V-Tier (e.g. a palatalized velar /kʲ/ has a ve-

<sup>1</sup> There is discussion about whether these later consonants are phonologically nasal stops or voiced oral stops, but for the present discussion we just need to oppose these with the unvoiced ones. For the reader interested in this discussion we suggest the works by Gudschinsky, Popovich & Popovich (1970), Araújo (2000), and Wetzels (2009).

lar C-Tier with a palatal V-tier). As the gestures of the C-Tier decrease in timing, the vocalic portion of the consonant emerges, as a prevowel (or “post-vowel” if the reduction takes place in the right edge of the C-Tier). As we will see briefly below, and considering that Maxakalí does not have consonants with secondary articulation, the places of articulation of the prevowels in this language coincide with the places of consonants. Since, in this paper, we are concerned with relating the prevocalization with sociolinguistic effects, we advise the interested reader to refer to Operstein (2010) and Silva (2015) for an extended analysis of Maxakalí prevowels (in the former work, for languages in general) in the Articulatory Phonology theory.

One fact about prevocalization in Maxakalí is that one same speaker may vary from a complete consonantal realization up to a complete vocalic allophone of coda, passing by a vowel + consonantal realization, thus forming a continuum. This variation occurs in the speech of both men and women and includes people of all ages. The examples from (1) to (4) show this variation:

- (1) /tepta/ → [tɛp'taʔ] ~ [tɛɣp'ta]  
‘banana’
- (2) /kohot/ → [ko'hot] ~ [ku'huə]  
‘cassava’
- (3) /kokec/ → [ku'kæç] ~ [ku'kæjç] ~ [ku'kæj]  
‘dog’
- (4) /ɲĩçõŋ/ → [ɲĩ'ʃõŋ] ~ [ɲĩ'ʃõũ]  
‘tongue’

Table 3 below shows each vocalic allophone of each consonant in Maxakalí. The prevowels agree in nasality/orality with the consonant from which they derive and have the same place of articulation of their respective consonant, so that palatal consonants have palatal glides as prevowels, velar consonants have velar glides, and so on. Bilabial prevowels are unrounded:

**Table 3.** Consonants and their respective prevowels

	<b>Labial</b>	<b>Dental</b>	<b>Palatal</b>	<b>Velar</b>
<b>Nasal stops</b>	m > ɲ̃	n > ã	ɲ > ỹ	ŋ > ũ
<b>Unvoiced stops</b>	p > ɸ	t > ɸ̣	c > j	k > uɣ

For a more detailed discussion on the identity of the prevowels in an autosegmental paradigm and further information, see Wetzels (1993) and Wetzels & Sluyters (1995). For an analysis of the same phenomenon in Optimality Theory, see Araújo (2000).

## 2. Objectives and Methodology

At first, the consonantal coda variation seemed to be random, as apparently no subject was categorical on their choices. Our main objective in this study, then, is to observe if there are any sociolinguistic factors interacting with consonantal prevocalization in Maxakalí. More specifically, we aim to analyze the interaction of sex and age with the multiple possibilities of coda vocalization.

We recorded 18 individuals, separated by gender and three age strata (youngsters, adults and elders). Each group had 3 subjects. The first age group comprised people from 15 to 29 y/o, the adult group from 30 to 44 y/o, and the older one comprising people that were 45 y/o or more. We made this choice because these groups correspond roughly to each generation of parents, grandparents and great-grandparents in that society, as it is common for people to get married and have children around 15 years old among the Maxakalí.

The recordings took place in July 2013, at Aldeia Verde (*Apne Yixux*), a recently established village with around 10 years of existence (as of 2016) and inhabited by 338 Maxakalí by the time of the data collection. In other words, we recorded 5.32% of the village inhabitants at the time. Only one family, composed by four people, spoke Portuguese at home on a regular basis; all other households use Maxakalí as their primary language of communication inside the village. Most speakers recorded have basic or no command of Portuguese, being able to understand the language with certain difficulty.

Being a horizontal society, that is, with few societal strata and without a big economical gap between the individuals, we did not consider the socio-economic factors, even though this scenario seems to be changing in recent years. The few teachers and health agents, who have a formal job and receive salary, have better financial conditions than the others, as they do not depend on governmental aid. We also did not consider the ability of speaking a second language nor a division by clans, which is nonexistent nowadays, according to the Maxakalí themselves. Having in mind that these factors may be relevant as well as the prestige that some people have in that society (such as shamans, for example), we plan to consider those criteria in future research.

Each individual was asked to perform two tasks: in the first one, the subject had to look at a picture of an animal, plant or body part and then was asked to say what he/she saw in their language. The words were selected considering various factors: place (bilabial, dental, palatal and velar) and manner (voiceless stop or nasal stop) of consonant articulation and position in the word, that is, whether the coda was in medial or final position. There were 32 words which the subjects had to say out loud, resulting in 576 tokens (32 words x 18 subjects). However, this first task generated 424 “analyzable” tokens as we had to disregard some data for various reasons, such as background noise, unintelligibility and unexpected answers.

The second task had the researchers asking the subjects to correct the researchers’ pronunciation as if they were learning Maxakalí and wanted to have a “proper” pronunciation. Thus, the researcher uttered a sentence and the individual was asked to repeat it. We used the same words from the first task and also considered the syntactic function and position of the word in the sentence. As shown by Campos (2009), the canonical order of the sentence constituents is Subject Object Verb (SOV), but the language allows an SVO marked order, with the Object being “emphasized” in this case. So, we filled the object position with the words regarded here, both in pre and post verbal position. This repetition task should total 1152 tokens (32 words x 18 subjects x 2 sentence positions), but, again, we had to disregard some of the results; in the end, there were a total of 1038 tokens.

The tasks were designed this way to enable the verification of the prestige form within this variation, with the first task being more spontaneous and informal, while the second one was formal and required the individuals to reflect about their own language as if they were teaching the researchers. Our hypothesis was that the older people had the prestigious, more conservative forms, while the youngsters would be the ones which used the innovative, lenited consonants more, even though they are not completely aware about this variation – we checked during informal conversations about this (and other) phenomenon. Usually, when talking about variation and prestige forms, they tend to talk about lexical variation, such as words which are / were used by elders and which are not used by the younger generations.

Although, as we said above, this phenomenon is in fact a continuum, we separated it binarily: we considered the full realization of the consonant and the prevocalization + consonant as non lenited and just the allophone realization, without the consonant, as lenited.

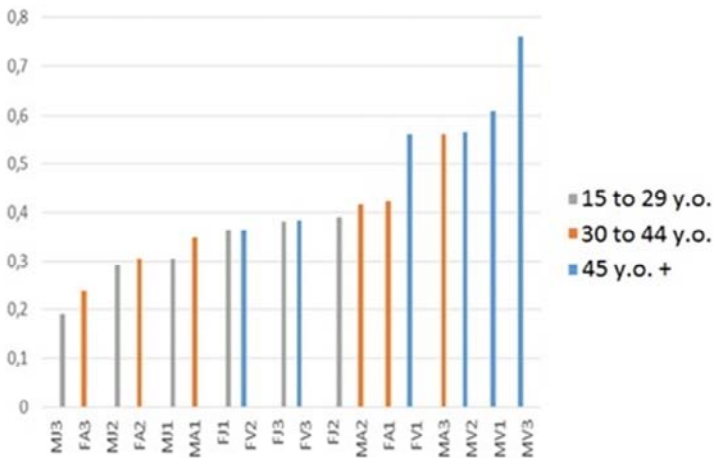
After data collection, we analyzed the data auditorially and afterwards proceeded to an acoustic analysis to verify, in the spectrogram, the realizations of

each token. We ran statistical tests such as chi-square and a logistic regression with a mixed effects model in order to see whether the two extra-linguistic factors and the linguistic ones were, in fact, involved in the consonant prevocalization.

### 3. Results

What we found is that both sex and age are relevant to prevocalization in Maxakali, with older speakers being more conservative in the sense of preserving consonantal realizations, as predicted. Even though we had to analyze the age variation in apparent time, as we do not have older data with a good scientific methodology that allow us to compare to our present data, we tried to make a real time analysis, using word lists collected by travelers in the 19th century (Martius 1867) and by Nimuendajú in 1938-39 (Araújo 1996).

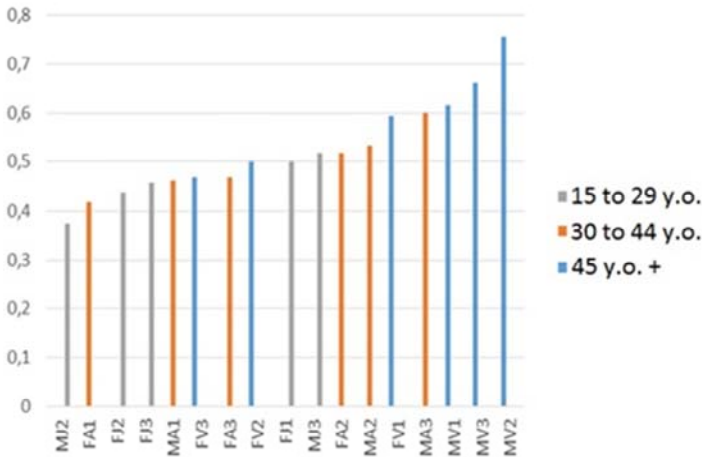
Figure 1 below indicates the conservation rate for each subject in the first task (M stands for male, F for female, J for youngster (in Portuguese, *jovem*), A for adult (*adulto*) and V for elder (*velho*):



**Figure 1.** Task 1 (naming) results of consonant conservation by age

Figure 1 shows us that the male elders are more conservative than the other groups. MV3, for example, have a 76% rate of consonant conservation, followed by MV1, with a little more than 60%. On the other hand, youngsters and adults

have a much more homogeneous behavior, with MJ3 being the most innovative, with a rate of less than 20% of consonant preservation. The second more innovative person is an adult: FA3, which, like MJ2, has less than 30% of consonant realization. The next figure reveals the results of Task 2 and will enable us to discuss not only the information contained in it but also to compare them with the Task 1 results we have just seen.



**Figure 2.** Task 2 (repetition) results of consonant conservation by age

The second task shows, again, that the male elders were more conservative than the other groups, partially corroborating our first hypothesis that elders would be the ones who had the prestige forms in their speech. Furthermore, as in Task 1, younger people were more prone to prevocalize than adults, but these two groups were much closer between themselves if compared to elders.

In order to see if apparent time is also a change in progress, we recurred to the Uniformitarianism Principle (Labov 1972), which states that “the linguistic processes taking place around us are the same as those that have operated to produce the historical record”, that is, the principles that were active in the past are still present in the linguistic structure of a language. Using the data collected by us on the prevocalization and consonantal place of articulation and the data found in 19th and in the first half of the 20th centuries wordlists collected by travelers (Martius 1867; Araújo 1996), we found the same patterns of prevocalization: our data indicated that the lenition rates for dental consonants were 94,7% and 86,1% for Tasks 1 and 2, respectively. Palatals were lenited 67,1%

and 67,7% of the times; labials had rates of 42,9% and 23,8% and velars, rates of 29,1% and 15,9%.

There are indications of lenition in the historical wordlists, even though it is difficult to attest the exact pronunciation at the time, because, as it is known, the linguistic technical knowledge of transcription at the time was almost inexistent (if it was existent at all). We have to take into account that those travelers did not learn the languages either, spending only some days with the people who spoke the language and making an impressionistic transcription, far from standardized. Considering this, we chose 29 random words in the lists present in Martius (1867) and it shows 100% of lenition of the palatal consonants, 50% for dentals, 29% for velars and 11% for labials. We did not consider all the words on the list because many of them have either changed from that time until today or we could not relate a word from the list to the present language. Nimuendajú's wordlist (Araújo 1996) is much closer to the present scenario, with a high rate of lenition in the coronal (dental and palatal) consonants. Further historical studies may clarify our understanding of this change, but our assumption is that the prevocalization started with the palatal consonants, due to their high rate of lenition in the past and in the present, followed by the dentals, velars and ultimately to labials.

The comparison of the results of both tasks also informs about speech style: the first task, which required the informants to name the images, was more casual. On the other hand, the second task had the subjects pay attention to their speech, as they were teaching us their language and had to use a more prestigious form. The results are interesting in that they show that the "norm" (even if it is an informal one) is the more conservative pronunciation of non-lenition. While, in the first task, consonant conservation rates were between 32,1% for the young group and 54,2% for the elderly group, with the adults rating 38,4%, in the second task we have rates of consonant preservation of 44,7%, 50% and 59,1% for youngsters, adults and elders, respectively. That indicates that the young and adult groups, when reflecting upon their own speech and having to use a prestigious form, will try to emulate the elder speech to a certain extent. As we will see next, the prestigious form is in fact the male elders' one, as older women seem to behave more like the adults.

The gender figure below is also very clarifying in the sense that the female group is more uniform than the male group, in both tasks. This figure indicates again that, in the first task, people of both genders tended to lenite more and, in the second one, the subjects were more conservative. Thus, consonant realization in the coda position is the prestige form, and male elders seem to carry this prestige more than any other group.





**Figure 3.** Tasks results of consonant conservation by gender

The figure above displays a more horizontal distribution of lenition done by women, that is, their realizations are more uniform if compared to men. In general, women of all ages have similar results to those of the adult men, except for FA3, who has a high lenition rate in Task 1 and FV1, who has a behavior regarding lenition similar to the older men. Among the men, MJ3 has the most discrepant realizations between casual and careful speech, with the higher lenition rate of all subjects in the first task, but with a degree of lenition similar to adults in Task 2.

Our explanation for this distribution in the thesis from which the data were taken (Silva 2015) was that it had to do with the daily activities of both women and men. While women did their chores together, such as cooking, taking care of children and gathering products such as fruits and other vegetables, men did their activities, such as hunting and taking care of crops, either alone or in smaller groups. Older men who do not have physical conditions to do such activities stay mostly at home. As they were more resistant to change, their rates are dissimilar to that of women.

It is true that male and female activities are separated and each gender has a well-defined list of things to do and the different distribution of lenition between men and women has to do with this to some extent. Even in activities which are done together, by both men and women, each gender has its own function: for example, in rituals, men have the role of intermediating the contact between

humans and spirits and women are the ones who give offerings (mainly crops) to the spirits through men. In exchange, the spirits offer meat to women, again, through the mediation of men.

However, we now see that our first conclusions were not entirely correct: men in fact have many activities in a group, as it is said from an ethnography about the Maxakalí:

[The few hunting expeditions] “usually had the participation of almost all men from a local group, with the exception of the elders, even when the expectations about the quantity of meat did not justify many people involved”<sup>2</sup> (Alvares 1992: 38).

With this in mind, it is still possible to justify the reason why there is a different distribution of lenition rates between male and female subjects, but it remains difficult to maintain the position about men across the age groups having such a different behavior, while women are much more similar between themselves. In the next session, we will discuss the conclusions as well as the future prospects for the research about Maxakalí phonology and sociolinguistics.

#### 4. Conclusions

As we could see in this paper, the variability of coda consonant realization in Maxakalí has some factors acting behind it and is not as random as it first seemed to be. Also, on the contrary of what is said in previous works on the phonology of the language, these various realizations are not in free variation, as it is clear that, besides linguistic factors (e.g. place of articulation), there are at least two extra-linguistic factors in play.

On the one hand, age is a strong factor that indicates that this variation is a change in progress. Wordlists from the 19th and beginning of the 20th centuries indicate that lenition rates were lower than today’s ones (except for palatals). Also, at least for men, older people are more conservative than the younger generation, in the sense that they preserve more the consonants. The tasks’ results also demonstrated that this same older generation’s speech is the one that is considered prestigious in the community.

On the other hand, women and men display different behavior, with the former being more similar between its subjects and the latter presenting very

---

<sup>2</sup> From the original: “[...] geralmente mobilizavam quase todos os homens de um grupo local, com exceção dos mais velhos, mesmo quando a promessa de carne não justificasse tantos envolvidos”.

different rates between youngsters and elders. The (partial) explanation for this is that women and men have such discrepant functions in this society if compared to the European-based ones, that it reflects in their own speech. We know that there are also many differences caused by gender in those languages, but this study and our current research show that there are further differences in Maxakali, such as prosodic contours, which are present in one gender's speech but absent in the other's. A deeper analysis of this society, both from ethnographical works and from our own observation, may improve our understanding as to why there is such a difference between male and female speech.

Our objective for future analyses is to collect spontaneous speech data to see if this correlation is maintained. There is an ongoing data collection of this kind of speech, to better comprehend not just the prevocalization of consonants, but other phonological phenomena such as nasal spreading. We also intend to collect data from other villages to see if there is some dialectal difference emerging in this ten-year span of their separation.

This new data will not only contribute for spontaneous speech studies, but also for frequency of use studies, as it will enable us to consolidate a corpus (albeit small) in which this factor can be checked as an additional one for our understanding of prevocalization (and other phonological phenomena). Both frequency and sociolinguistic studies in an indigenous language context are very incipient in Brazilian linguistics and we aim to contribute by filling this gap, as we develop this kind of research with languages such as Maxakali.

### **Acknowledgments**

We would like to thank the support of Professors Maria Filomena Spatti Sândalo (Unicamp) and Andrew Ira Nevins (UCL) for the supervision of this research. We would also like to acknowledge the financial support of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes), without which this research would not be possible.

### **References**

- Alvares, M.M. 1992. *Yãmĩy, os Espíritos do Canto: A Construção da Pessoa na Sociedade Maxakali*. MA diss., Universidade Estadual de Campinas.
- Araújo, G.A. 1996. Mašakarí: Vocabulário Maxakali de Curt Nimuendaju. *Caderno de Estudos Lingüísticos* 31: 5-31.

- Araújo, G.A. 2000. *Fonologia e Morfologia da Língua Maxakalí*. MA diss., Universidade Estadual de Campinas.
- Campos, C.S.O. 2009. *Morfofonêmica e Morfossintaxe do Maxakalí*. PhD diss., Universidade Federal de Minas Gerais.
- Gudschinsky, S.C., Popovich, H. & Popovich, F. 1970. Native Reaction and Phonetic Similarity in Maxakalí Phonology. *Language* 46(1): 77-88.
- Labov, W. 1972. Some Principles of Linguistic Methodology. *Language in Society* 1(1): 97-120.
- Martius, K.F.P. 1867. *Beiträge zur Ethnographie und Sprachkunde Amerikas zumal Brasiliens, II. Glossaria linguarum Brasiliensium*. Leipzig: Friedrich Fleischer.
- Nimuendajú, C. 1958. Índios Machacari. *Revista de Antropologia* 6(1): 53-61.
- Operstein, N. 2010. *Consonant Structure and Prevocalization*. Philadelphia: John Benjamins.
- Silva, M.A.C. 2015. *A Coda Consonantal em Maxakalí*. MA diss., Universidade Estadual de Campinas.
- Wetzels, W.L.M. 1993. Prevowels in Maxacali: Where they come from. *Boletim da Associação Brasileira de Linguística* 14: 39-63.
- Wetzels, W.L.M. 2009. Nasal Harmony and the Representation of Nasality in Maxakali: Evidence from Portuguese Loans. In A. Calabrese & W.L.M. Wetzels (eds), *Loan Phonology*. Amsterdam/Philadelphia: John Benjamins, 241-270.
- Wetzels, W.L.M. & Sluyters, W. 1995. Formação de Raiz, Formação de Glide e 'Decrowding' Fonético em Maxacali. In W.L.M. Wetzels (ed.), *Estudos Fonológicos das Línguas Indígenas Brasileiras*. Rio de Janeiro: Editora UFRJ, 103-149.