

Glottalization and tonal system in Korebaju. An interdialectal study of Tama and Korebaju varieties

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Abstract

Korebaju (ISO 639-3: coe) [kó'rèbàjí] is an endangered Tukanoan language spoken in the foothills of the Colombian Amazon. Two fieldworks carried out between 2021 and 2023 on a sample of 24 native speakers (12 females and 12 males) from two different varieties: Tama and Korebaju, located in two different villages, provides new data for improving intra- and inter-dialectal phonetic-phonological description of Korebaju. The main objective of the thesis is to describe and understand the glottalization phenomena in two Korebaju varieties, Tama and Korebaju, considering the segmental and suprasegmental levels and their mutual relations. This research also aims to analyze and understand, the relationship between tone and glottalization that surfaces at the segmental level in these two varieties.

Index Terms: Language description, Tucanoan, acoustic formant space, acoustic duration, dialectal variation.

1. Introduction

Korebaju [kòrèbàhí] (ISO 639-3: coe) is a tonal language [1], [2] of the Western Tukanoan family [3], spoken in the departments of Caquetá and Putumayo, in southwestern Colombia. It is spoken by around 2,000 men and women in 27 villages [4]. The Korebaju community is currently the product of the merger of four communities: Korebaju, Tama, Macaguaje, and Carijona [5], and dialectal varieties exist according to clan ancestry: Carijona, Tama, Macaguaje and Korebaju.

According to previous descriptions [6], [7], [8], Korebaju presents a phonological system of six oral vowels /i, e, a, o, u, i/, six nasal vowels /ĩ, ê, ã, õ, ù, ỹ/ and three glottal vowels /aʔ/, /eʔ/, and /oʔ/, as well as 17 consonants /p t k p^h t^h k^h β φ s h w ʃ m n ɲ ɥ ɾ/.

The results of these latter studies raise four points of disagreement: the segmental or suprasegmental status of nasality and glottalization, and the nature of the language's tonal and/or accentual system. These same disagreements have also surfaced in typological studies of the Tukanoan family.

2. Research Questions

This thesis aims to describe and understand glottalization phenomena in the Tama and Korebaju varieties, considering the segmental and suprasegmental levels, and their mutual relations.

Another aim of this research project is to analyze and understand the relationship between glottalization and tone, in these two varieties, and to clarify their similarities and

differences concerning other languages of the Tukanoan family and other languages of the world for which research focusing on glottalization has been carried out.

3. Methodology

24 speakers (12 women and 12 men) of two different generations (23-29 years and 47-56 years) and two different varieties (Tama and Korebaju) took part in this study.

A list of 275 target words inserted in a carrier sentence was recorded. The construction of this list made it possible to be systematic in identifying minimal and quasi-minimal pairs in all possible contexts among all speakers.

The carrier phrase was constructed as follows:

/cikínà ikámè ___ kó'rèbàhí ciòpí/
{cikínà iká-mè ___ kó'rèbàhí ciòpí}
we say-PL ___ Korebaju language
'We say ___ in Korebaju'

A Laryngograph D800 EGG electroglottograph was used to collect data synchronizing acoustic signal, electroglottographic signal, nasal and oral acoustic pressure variation. The EGG was connected directly to a laptop via a USB port. Voice Suite software was used for data collection. Recordings were made using an omnidirectional microphone placed inside the Glottal Enterprise Teen-Adult oronasal mask, connected to the EGG D800. The sampling frequency was 96 kHz for all four channels: wav, EGG, nasal airflow and, oral airflow (i.e., 24 kHz for each channel).

A socio-phonetic survey was conducted and will help with audio and electrophysiological data analyses, and Korebaju varieties, considering the segmental and suprasegmental levels, and their inter-relations.

4. Key Challenges

Korebaju presents different phenomena in its phonological and morphological system that make its description complex.

- *Allomorphs*

Korebaju has several allomorphs linked to different phonological phenomena in the language. In addition, these allomorphs can also be the result of glottalization or tonal variation.

- *Epenthesis at morphological boundaries*

Epenthesis is observed at morphological boundaries as a consequence of the existing tonal contour. A recurrent example is the epenthesis of a glottal production in an intervocalic context, provided the tone of the preceding vowel is low.

- *Nasality*

Korebaju language is marked by a weak nasality, even in the presence of the [+nasal] feature, and is therefore difficult to detect in the spectrogram, and must be corroborated by using articulatory phonetics tools. In some cases, it can be detected by allomorphs with the [+nasal] feature. But in the absence of these, nasality is not detected in a purely acoustic corpus.

5. Results and Future Plan

5.1. Oral Vowels

Our phonological survey corroborates the six oral vowels described by [6] /i, e, a, o, u, i / for both dialectal varieties.

Before palatal consonants, we noted a fronting of the high central unrounded vowel /i/ produces as a near-high front unrounded allophone [i], and of the high back rounded vowel /u/ which is realized as a near-high back rounded vowel [u]. This second allophone differs from the findings of the study previously conducted for the Korebaju variant [6].

5.2. Glottal Vowels

Analyses of vowel durations indicate no significant differences between non-glottal and glottal vowels of the Korebaju and Tama varieties supporting the results of the previous study [6].

These surveys provided a set of 5 phonological glottal vowels for both language variants /i̥, e̥, ḁ, o̥, u̥/. A glottal back-rounded vowel [u̥] was randomly produced by speakers of both generations and was surprisingly omitted by all females of the Tama variant. This phone can occur in any position, but its phonological status has not been confirmed. This investigation supports a phonological contrast between modal and glottal for the peripheral vowels, as proposed by [6], [7], and [8], through minimal pairs in first and second root positions as well as in some affixes. However, it also provides evidence for a phonological status for the high glottal unrounded vowels /i̥/ (a) and /i̥/ (b) that could not be demonstrated in previous studies on the Korebaju variant ([6], [7], [8]).

a)	/sisi/	/si̥si/
	{sisi}	{si̥si}
	‘Sanguinus Mistax’	‘Ppossum Commun’
b)	/sisi-à/	/si̥si-á/
	{sisi-à}	{si̥si-á}
	apophyse mastoid-CL	dirty-CL
	‘apophyse mastoid’	‘dirty Bactris Gasipaes’

5.3. Nasal Vowels

Our examination of vowel’s acoustic structure, which included spectrographic analyses, showed that the nasal formant frequencies belong to the syllable containing the nasal vowel and not to the whole word. As a result, our investigation did not find a nasal harmony affecting the whole word. Nasality seems limited to the domain of the syllable.

Likewise, this study reports 6 nasal vowels [ĩ], [ẽ], [ã], [õ], [ũ], [ĩ]. However, no minimal pairs were found to demonstrate their contrastive properties. The minimal pairs given in previous studies show changes at the level of tone or glottalization that appear in certain contexts as evidenced by the examples c, d, e, and f.

c)	[pĩã]	[pĩʔa]	d)	[mã:]	[mãʔá]
	‘chili’	‘bird’		‘macaw’	‘road’

f)	[cĩõ]	[cĩʔõ]	g)	[caĩ]	[cãʔi]
	‘girl’	‘crop’		‘jaguar’	‘liane_yare’

Considering that Korebaju is a tonal language [1], [2], [6], [7], [8], and that the intervocalic glottal is still under investigation as there is no consensus of its segmental or suprasegmental status either in the previous descriptions of Korebaju nor in the descriptions in other languages of the Tukanoan family ([9], [10], [11], [12], [13], [14]), such word pairs cannot be categorized as minimal pairs that can distinguish phonemic oral and nasal vowels in Korebaju in either variety.

This study did not find any interdialectal differences between Tama and Korebaju. Intradialectal differences could be observed at the gender level for certain generations and certain vowels.

This study confirms that glottalization seems to be part of the vowel as noted by [6] and [8], although its status as a segmental articulatory feature or a suprasegmental is yet unclear. We found a tendency for glottal vowels to be longer, but the differences were not significant for all set of vowels. Furthermore, this research found two phonemes corresponding to the closed glottal unrounded vowels /i̥/ and /i̥/.

Finally, this study suggests that the possible perceptual cause of strong glottalization for speakers of the TAM variant may be due to a morphological change of certain words like the word ‘narrow’ where a possible insertion of a copulative predicate at the second syllable in the TAM variant creates the condition for a resyllabification of the word [mã-ʔ-ã-kã-rì] {CL-COP-narrow-CL}, while the COE variant will produce a modulated tone without insertion of the same copula [mã-ʔ-kã-rì] {CL-narrow-CL}.

These results are still under investigation. Our ongoing research is looking at the relationship between tone and nasalization and the different types of glottalization present in the language.

6. Expected Contributions

This experimental study will provide the first phonetic-phonological description of the dialectal varieties of a Tukano language. The results obtained will be interpreted according to the theoretical principles of autosegmental phonology [15].

These will contribute to the description of Korebaju, which lacks analysis compared with other languages of the same linguistic family. This study will also present possible generational changes in glottalized productions and tones in the language. It will contribute to completing and re-evaluating these two phenomena in the context of the current debate between typologists of Tukanoan languages, who are still discussing their status, treatment and mutual relationship in the various Tukanoan languages, particularly the WT languages.

The relationship between tone and glottalization is also a subject of study in different languages of the world (e.g. in North Saami, Baal, [16]; Zapotec, [17]; Vietnamese, [18]). This thesis will contribute to the study of the relationship between tone and glottalization of segments by providing first-hand data and original analyses.

The project will also be part of an Open Science approach since the results obtained from this study will be digitized and made available to the Korebaju community as well as to various linguists interested in the study of these phenomena. This research will also provide the Korebaju community with a compilation of documentation of their traditional narratives and rituals, enabling them to perpetuate their culture.

7. References

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