Language-specific intonation in the Palenquero/Spanish bilinguals

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Abstract

Creole languages from the Caribbean seem to exhibit a hybrid prosodic system with tones from African substrate languages, and stress from European dominant languages. It is unknown however whether bilingual speakers of creole languages, such as Palenquero, have specific contexts where their two languages are prosodically distinct. Hence, this study examined whether the bilingual Palenquero/Spanish speakers keep their two languages prosodically distinct in statements and yes/no questions. Speakers performed two discourse completion tasks in two unilingual sessions, the first one in Palenquero and the second one in Caribbean Spanish. F0 contours and final lengthening of 189 five-syllable statements and 153 yes/no questions, from 9 participants, were tested with functional principal component and linear regression analyses. Results demonstrated that their two languages did not have distinct intonation in statements, and that final lengthening was not conditioned by language. Despite that, these speakers kept their two languages prosodically distinct in questions. Palenquero yes/no questions ending with iambic rhythm exhibited F0 peaks at the same height, yielding the global implementation of flat and plateau-shaped contours that did not occur in their Caribbean Spanish. It implies that these bilingual speakers, having two languages with a high overlap, can acquire/develop language-specific intonations in specific contexts.

Index Terms: Palenquero, Spanish, intonation of statements and yes/no questions, bilingual speakers of creole languages

1. Introduction

Bilingual speakers may acquire/develop phonological categories that are language-specific and involve distinctions between their two languages [1, 2, 3]. The extent to which bilingual speakers are able to keep the intonation of their two languages separated, on the other hand, raises potential difficulties due to the substantial variability found in prosodic data, and the influence exerted by the dominant language. Bilingual speakers of creole languages from the Caribbean are claimed to have a “hybrid” prosodic system with tones from the substrate African language, and stress from the dominant language, the European language [4]. Therefore, the bilingual Palenquero/Spanish speakers offer an excellent testing ground to gauge the degree of separation for the intonation production of two languages under heavy language contact conditions. To this end, this study tries to find whether the bilingual Palenquero/Spanish speakers keep their two languages prosodically distinct in statements and yes/no questions.

It is argued that suprasegmental phenomena such as intonation is more vulnerable to the effects of the dominant or majority language than the segmental information [5], whereby bilingual speakers may be more prone to converge their intonation towards this direction. Different studies have then focused on the acquisition of L2 intonation at different proficiency levels (e.g. [6, 7, 8]) and highlighted the influence exerted by the L1 over the L2 prosody (cf. Prosodic learning interference hypothesis in [9]). The intonation of bilingual speakers, however, is not only moderated by the dominant language given that the non-dominant language may exert influence over the dominant as well. This was the case of Russian speakers who acquired English as a result of living in an English country for a long time. When they returned to Russia, they had changed the prototypical high-low intonation of Russian yes/no questions by the English high-rise intonation [10]. How bilingual speakers reflect these language-specific differences in their intonation, and why some of these differences are preserved under language contact conditions are crucial questions that are yet to be answered. Empirical evidence from crosslinguistic studies has demonstrated that convergence is of the utmost importance for bilinguals, however, this may be symmetric, when the two languages gradually become more similar, or asymmetric, when one language adopts the features of the other [11].

The symmetric convergence of prosody for bilingual speakers can be illustrated with the study of the Turkish/German bilingual girls, all of whom ended up producing short rises from Turkish in the nuclear contours (i.e. final contours) of narratives in German, and steeper rises to indicate pragmatically salient information in the nuclear contours of narratives in both German and Turkish. Steeper rises are generally used by monolingual speakers of German in nuclear contours, while Turkish monolingual speakers use them to mark prosodically the more salient information. It all implies that these Turkish/German bilingual girls have merged the prosodies from their two languages to have a single intonation grammar used in both languages, which constitutes a symmetric convergence of intonations [12]. On the other hand, yes/no questions from the aforementioned bilingual Russian/English speakers demonstrate how these bilinguals adopted the English high-rise for their Russian questions, an asymmetric convergence of prosody [10]. Steeper rises are generally used by monolingual speakers of German in nuclear contours, while Turkish monolingual speakers use them to mark prosodically the more salient information. It all implies that these Turkish/German bilingual girls have merged the prosodies from their two languages to have a single intonation grammar used in both languages, which constitutes a symmetric convergence of intonations [12]. On the other hand, yes/no questions from the aforementioned bilingual Russian/English speakers demonstrate how these bilinguals adopted the English high-rise for their Russian questions, an asymmetric convergence of prosody [10]. 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in San Basilio de Palenque, Colombia, in South America. It emerged from the contact of the African slaves brought to Colombia with the Spanish conquerors, in the XVII century [13, 14]. Palenquero contains lexical and morphological elements from Bantu origin [15], possibly coming from two dialects of Kikongo: Kiyombe and Civili, both of which are spoken in Bakongo communities [16, pp. 22–23],[17]. However, its lexical donor language (i.e. lexifier) is Spanish. Hualde and Schwegler [15], as well as Correa [18] found that the Palenquero stress syllables frequently exhibit a “high tone”, because of which, they have claimed that speakers reinterpreted Spanish stress with the surface form of a substrate African high tone (H), as speakers from Bantu languages did with words borrowed from French and Portuguese (cf. Kikongo languages in [19]; and creoles such as Saramaccan [20] or Papiamento [21]). Intonational descriptions of Palenquero not only highlight the occurrence of a H on each stressed syllable, but also the occurrence of flat or plateau-shaped intonation contours, and the truncation of the low final-boundary tone (L%) when the last syllable of the utterance is stressed [15, 22, 18]. Correa [18] has also suggested that Palenquero speakers show a long nuclear fall correlated with final lengthening, and that this is less frequent in the Spanish of the bilingual Palenquero/Spanish speakers. Thus far, however, there is no certainty of the extent that Palenquero prosody is kept distinct from the Spanish of these bilingual speakers.

This study has then examined whether the bilingual Palenquero/Spanish speakers keep their two languages prosodically distinct in statements and yes/no questions; and given that final lengthening was considered to occur more in Palenquero than Spanish, it also aimed to resolve this conjecture to better understand this dimension of language prosody in these bilinguals. Speakers have performed two discourse completion tasks in two unilingual sessions, the first one in Palenquero and the second one in Caribbean Spanish. The F0 contours and final lengthening of 189 five-syllable statements and 153 yes/no questions, from 9 participants, were tested with functional principal component and linear regression analyses. Yielded results demonstrated that their two languages did not have distinct intonation in statements, and that final lengthening was not conditioned by language. Despite that, these speakers kept their two languages prosodically distinct in questions as Palenquero yes/no questions ending with iambic rhythm exhibited F0 peaks at the same height, yielding the global implementation of flat and plateau-shaped contours that did not occur in their Caribbean Spanish.

The main contribution of these results is that these bilingual speakers, having two languages with a high overlap, can acquire/develop language-specific intonations in specific contexts.

2. Method

A total of twelve Palenquero/Spanish bilingual speakers (six of them female) were recruited with the help of community leaders and teachers who were familiar with their Palenquero proficiency. They have completed a linguistic background questionnaire, and eventually the utterances of only nine bilingual speakers (three of them females), mean age=39.5, were considered for the analyses. Participants who did not follow the instructions, as some of them did not understand the contexts assigned for the elicitation task, and those whose pitch contour renditions were defective in Praat [23] due to undetectable vocal fold vibration, or pitch tracker doubling/halving errors, were not considered.

Forty-eight five-syllable utterances were created to elicit the intonation of statements and yes/no questions. The utterances were designed with the assistance of a community leader and a Palenquero teacher, following the grammar described in [24, 25]. Besides language and utterance-type variability, the stimuli exhibit variance from the final rhythm, which was either trochaic or iambic for the last two-syllable word of each utterance. Monophthongs from the last stressed syllable in each utterance were used to gauge the effects from the final stress, type of utterance and language on the final lengthening.

Since bilingual speakers seem to inhibit cross-linguistic interactions in unilingual contexts (see [26, 27]), the bilingual Palenquero/Spanish participants were recorded on two different days to avoid priming effects from the non-target language. They completed two discourse completion tasks [28] suited to the daily life of the community. Participants heard a brief situational background, along with one direction prompting the speaker to reply as in the following contexts:

1. PAL. Nuno sabé ná si andi Balá ané a ten kaló ná. Chittá Nuno ke andi Balá ané a ten kaló. (Expected response: Nuno, andi Balá, ané a ten kaló.)

2. PAL. Bo sabé ná si andi Balá ané a ten kaló ná. Prundá Nuno si andi Balá ané a ten kaló? (Expected response: Nuno, andi Balá, ané a ten kaló?)

3. SPA. A Nuno le gusta escuchar música de Kalet. Dile a Nuno que donde Balá tú oíste su Kalet. (Expected response: Nuno, donde Balá, yo oí tu Kalet.)

4. SPA. No recuerdas si oíste las canciones de Kalet que tanto le gustan a Nuno, adonde Balá. Pregúntale a Nuno si donde Balá tú oíste su Kalet. (Expected response: Nuno, donde Balá, yo oí tu Kalet?)

Data collection required the voice of a familiar interlocutor who was recorded giving instructions about the real-life situations of the community. The tasks were then designed on psycho.py [29], and all the speakers were exposed to the same voice.

2.1. Data analysis

A total of 428 utterances were collected, but after removing outliers and influential points using Cooks distance [30] and the car package in R [31], only 342 utterances were considered for the F0 analysis, and 393 utterances, for the final lengthening analysis (79.9% and 91.8%, respectively). Vowel length in the final stressed syllable was automatically extracted with Praat and was measured in penultimate and final syllables accounting...
for the contrast of trochaic and iambic rhythm, such as PAL. kalo ‘soup’ and PAL. kaló ‘heat’, SPA. palo ‘stick’ and SPA. Kalei ‘name of a well-known musician’. Measurements were scaled and log-transformed in R [32] following [33]. In a similar vein, the variance of F0 contours from statements and yes/no questions was explained through the main and interaction effects of final stress and language. The process for the F0 analyses can be outlined in three major steps: 1.) Time-normalize F0 contours through the extraction of ten F0 slices per syllable, fifty in all per utterance. F0 samples were automatically extracted at equidistant times on each syllable, using ProsodyPro [34], a script to be run on Praat [23]. 2.) Normalize individual pitch ranges using z-scores by subject from log-transformed F0 contours. Outliers and influential points were manually transformed into NA’s (not available). 3.) Perform Functional Principal Component Analysis (FPCA, [35, 36]) in order to reduce F0 dimensionality, and thus obtained the most substantial modes of F0 variations (i.e. Functional Principal Components, FPCs) using the R-package fda [36]. F0 was analyzed incrementally with the first three FPCs which were then regressed onto the interaction of final stress and language with the lm function in R.

2.1.1. Functional principal component analysis

FPCA has been used here to account phonetically for the most important modes of variation in F0 contours. Linear regression analyses were performed subsequently in order to predict each substantial mode of F0 variation from the main effects and the interactions of explanatory factors. FPCA is a data-driven semi-automatic analysis used to understand the dominant modes of variation in functional data which, in particular, reflect smooth curves generated from the same data [36, 37]. The statistical analysis of F0 contours was then achieved through the combination of FPCA and linear regression models as in [38, 37]. F0 dimensionality was reduced with FPCA by extracting the main component curves that describe the most substantial F0 variations, whereby the first component curves correspond to the first most F0 variation (FPC1) relative to the mean F0 contour, the second component curves correspond to the second most F0 variation (FPC2), the third component curves to the third most F0 variation (FPC3), etc. (see [35]). FPCs result in FPC-scores which capture the specific weight and contribution of each observation (i.e. each F0 contour) to each F0 variation. The R code used to run these analyses was adapted and written from the versions of [39, 40, 41]. Significant effects from the main explanatory variables and their interaction were visualized through smoothed F0 contours describing the cumulative effect of each FPC averaged across the levels of final stress and language conditions.

3. Results

The bilingual Palenquero/ Spanish speakers lengthened the final syllable in both Palenquero and Spanish (see Figure 1). Language, therefore, does not condition the occurrence of final lengthening in these bilinguals. This feature not only did take place in utterances ending in trochees, but also and more significantly when the utterance ended in iambic rhythm. However, it was blocked in yes/no questions, being solely used in statements as illustrated in Figure 1.

Even though the speakers mostly exhibited the same intonation in both Palenquero and Spanish statements, the FPC 2, accounting for 25.6% of variance across all F0 contours from yes/no questions, shows that the bilingual Palenquero/ Spanish speakers have kept their two languages prosodically distinct in this context. The variance accounted for by the FPC 2 was explained by the interaction of final stress and language as illustrated in the panel B of Figure 2). Therefore, Palenquero yes/no questions ending with iambic rhythm had a lower F0, and exhibited F0 peaks at the same height, yielding the global implementation of flat and plateau-shaped contours that did not occur in their Caribbean Spanish (see panel C, Figure 2). In addition to this, it is worth noting that the L% was not significantly truncated in either statements or yes/no questions.

4. Discussion

This study tried to answer whether the bilingual Palenquero/ Spanish speakers keep their two languages prosodically distinct in statements and yes/no questions, and whether the speakers had more final lengthening in Palenquero than Span-
Results indicate that the speakers keep their two languages intonationally distinct in yes/no questions ending in iambs, and that final lengthening occurs in both Palenquero and Spanish statements. Accordingly, F0 contours from Palenquero yes/no questions were flat, having peaks at the same height and without a sharp declination for the overall contour. It all resulted in the global implementation of flat or plateau-shaped contours, which parallels previous reports from [15, 18]. Spanish yes/no questions, in contrast, show a much sharper declination when they ended with iambs, whereby flatter or plateau-shaped intonation contours were less frequent in Spanish. The main implication of this result is that the language-specific intonation in the Palenquero/Spanish bilinguals is limited, yet occurred thus far in a specific linguistic context, even despite the intense contact with Caribbean Spanish.

This distinction explains 25.6% of the F0 variance across all yes/no questions, then the contexts where the intonation of the bilingual Palenquero/Spanish speakers converged into one undifferentiated intonation system abounded. For instance, the intonation of statements ending with trochees or iambs did not differ between the two languages, nor in yes/no questions ending with trochees. Hence, the final rhythm of the intonational phrase (IP) moderates the production of language-specific intonation in the bilingual Palenquero/Spanish speakers. The trochaic foot, being found in 79.5% of Spanish words [42], did not have a relation with the intonation distinction for the languages of the speakers, whereas the iambic foot, being found in 17.7% of Spanish words [42], did show this relation. Stress then plays a fundamental role to understand the contribution of language to the F0 variance of bilingual speakers and, at least for the bilingual Palenquero/Spanish speakers, raises the conjecture that African tonal remnants could be associated with marked rhythms, such as the Spanish iambic stress, and might have effects on the global intonation, being the context for the language-specific intonation of these bilingual speakers.

Reports from [15, 22, 18] show that Palenquero speakers truncate the realization of the L% in statements ending with a stressed syllable. Some utterances from this study contained L% truncation, and despite the fact that the L% tones were ostensibly higher for final iams, more statements and yes/no questions had this edge tone. Lipski [22] suggested that the possible locus for the Palenquero H tone was in IP-final position, where he explored the effects from the combinations of two or more stressed syllables of statements. Building up from Lipski’s findings, this study provides more evidence to believe that iambic stress in the IP-final position of yes/no questions is the context that includes the global implementation of plateau-shaped intonation contours in Palenquero, and sharper peaks/falls in the Spanish of these bilingual speakers. Stress syllables attract intonation pitch accents [43], and plateau-shaped contours can be confined to occur within the boundaries of the stressed syllable as in North Frisian [44] or Shilluk [45], Palenquero/Spanish stress syllables in final and non-final position therefore need to be explored in order to determine whether these global effects on yes/no questions are originated locally.

More research is also needed to gauge the extent to which the language-specific intonation of Palenquero/Spanish bilinguals is used for language identification/discrimination. Thus far, these findings have further implications to the phonetic study of intonation in bilingual speakers of contact-induced languages, as they provide a model that captured the empirical effects of language on the F0 and duration variances.

5. Conclusions

The main contribution of this study is that the bilingual Palenquero/Spanish speakers, having two languages with a high overlap, can acquire/develop language-specific intonations, and keep their two languages prosodically distinct in some specific linguistic contexts. Could these differences be due to the substrate effects from a tonal African language? This cannot be derived from these results, as it is still unknown whether the monolingual speakers of the neighboring Caribbean Spanish also exhibit plateau-shape intonation contours for yes/no questions ending with iambic rhythm. Furthermore, the modelling of intonation using FPCA and linear regression will also need to replicate more studies that have followed the Autosegmental-Metrical Model as they provide solid ground to test these methods. Finally, the intonation of the bilingual Palenquero/Spanish speakers provide a case in point to present how the intonation of non-dominant languages are especially informative with regard to the production of language-specific intonation in bilinguals.
6. References


