LATERALIZATION OF THE SIMPLE VIBRANT /R/ TO /L/ IN PUERTO RICAN DIASPORA

Yhosep Barba

Rutgers University
y.barba@rutgers.edu

ABSTRACT

This paper analyzes the production of the lateralization of the simple vibrant /r/ to /l/ within four Puerto Rican women residing in North Carolina. Throughout a reading out-loud task, F3 and F4 trajectories are examined to determine the nature of lambdacism.

Keywords: lambdacism, lateralization, accommodation, formants, tap

1. INTRODUCTION

This article delves into sociocultural dynamics and linguistic experiences of four Puerto Rican women living in North Carolina. Here, I present insights into the intersection of identity, indexicality, language, and social context. Through the examination of open-ended interviews and the acoustic analysis of the lateralization of the simple vibrant /r/ to /l/ in final syllable and word of four participants, this article aims to show the complexities of language use, negotiation of identity, and responses to social dynamics in a multicultural setting. Thus, the acoustic analysis offers a window into phonetic variation within the Puerto Rican diaspora, showing differences in articulation strategies and formant trajectories.

2. LITERATURE REVIEW

2.1. Spanish in Puerto Rico

The Hispanic Antilles, an archipelago that extends from the eastern tip of Yucatan Peninsula and the southern segment of Florida to the coast of Venezuela, comprises the Greater and Lesser Antilles. These include Spanish-speaking countries such as Cuba, the Dominican Republic, and Puerto Rico (Alba, 2016). Despite being geographically dispersed across different islands and, additionally, including diverse cultures, there is a shared perception that they all have the same dialect: the Caribbean Spanish. Alba (2016) notes that there exists dialectal diversity within the Caribbean Spanish, influenced by sociocultural and educational factors, although certain linguistic features are shared among Cuba, Puerto Rico, and the Dominican Republic. At the phonetic-phonological level, Spanish spoken in the Caribbean exhibits vowel stability in terms of production, with no elision of unaccented vowels as perceived in central zones of Mexico and Bolivia. Moreover, there is a tendency towards nasalization, and both the pharyngeal aspirated realization of /x/ and the changes experienced by alveolar consonants /n, s, r, l/ at coda position, are adjustments triggered by articulatory relaxation. However, it is worth noting that these features do not occur with the same frequency, nor they are present with the same variations in all Caribbean regions (to explore further morphosyntactic variation and lexical features, see Alba, 2016).

Puerto Rico has seen how two official languages (Spanish and English) coexist since 1992; nonetheless, Spanish has been the common denominator of general use within its population (Ortiz, 2022). Scholars have examined this phenomenon of language contact from various perspectives (see Schmidt 2014; Carroll, Rivera, & Santiago 2015; Domínguez-Rosado 2015; among others), alongside its political implications and its relation to the U.S colonial project (see Malavet, 2000; and Schneider, 2013 for further insights). The sociopolitical status of Puerto Rico has created perceptions that its Spanish has been significantly influenced by English, unlike other Caribbean islands, with some even suggesting that it has evolved into a "mixed language" (Alba, 2016). Despite this, scholars such as López Morales (2004) argue that research on Puerto Rican Spanish portrays a variety that shares linguistic features with other Caribbean dialects while also holding its own distinct characteristics. Ortiz (2022), on his side, contends that its contact with English has contributed to the emergence of a more bilingual society in Puerto Rico, particularly among the elite, young professionals, and Puerto Ricans who move

between both territories: the US. and Puerto Rico (also explore Schmidt 2014; and González Rivera & Ortiz López 2018).

Puerto Rican Spanish phonology has been studied for more than half of a century, starting with Navarro Tomás in 1948. According to Alba (2016), there are seven general features that may describe the Puerto Rican phonological system nowadays (although not all of them are present at the same time and across different populations): 1) The posterior pronunciation, in the velum area, of the multiple vibrant /r/ (erre) – like the Castilian "jota", as in carro > [káRo], 2)The aspiration of the final /s/ in syllables and words such as esta > [ehta] and propuesta > [propuehta], 3) The elision of the post-tonic intervocalic /d/ in words such as acabado > [acabao], 4) The velarization of words that end in /n/ as in muy bien > [muy bieŋ], 5) The production of the /x/ (jota) as a weak aspiration [h] in ejemplo > [ehemplo], And 6) the lateralization of the simple vibrant /r/ to /l/ in final syllable and word position (phenomenon called lambdacism) as in the cases of puerta > [pwélta] and comer > [komél].

3. RESEARCH QUESTION

Little is known whether the perceptions regarding lambdacism and its usage (due to processes of accommodation) persist within Puerto Ricans who have migrated to the United States and have been in contact with other Spanish-speaking communities. Consequently, the following research questions are posed:

- Does the sociophonological feature of lambdacism persist among Puerto Ricans when immersed in a Spanish multilingual context like North Carolina?

4. HYPOTHESIS

It is hypothesized that lambdacism may persist among Puerto Ricans in Spanish multilingual environments like North Carolina, albeit to varying extents. The degree of variation – whether maintenance, reinforcement, or attrition of this sociophonological feature – hinges on positive or negative processes of assimilation and/or accommodation. Consequently, individuals who have positive experiences, i.e., not encountering judgment for their speech when interacting with other Spanish speakers, are likely to maintain their sociophonological features. On the other hand, those with negative experiences, condemned and minoritized by their pronunciation, may assimilate into the prevalent linguistic norm, resulting in a dual linguistic identity that prompts code-switching based on context and need.

5. METHODS

5.1. Background and linguistic survey check

Four participants took The Language Experience and Proficiency Questionnaire (LEAP-Q). The LEAP-Q is a questionnaire that is used to collect self-reported proficiency information from monolingual, bilingual or multilingual speakers. Although this test is widely used to measure participants' linguistic proficiency, this survey will be used to confirm native-speaker status (Hespos & Piccin, 2009), and delve deeper into language exposure with other Spanish-speaking communities (this has required a small adaptation from the original version created by Marian, Blumenfeld & Kaushanskaya (2007)).

5.2. Interview and interview analyses

Sociolinguistic interviews were performed via Zoom and participants were recruited using the 'snowball method' (Oliver 2006; Schilling 2013; Carter & Wolford 2017) in which the first participant introduced a friend of her friend, and so on. All the interviews were conducted in Spanish, and it was mediated by different questions that aimed at looking deeper into participant's migration processes -from Puerto Rico to North Carolina-, cultural shocks and/or general experiences with other Spanish-Speaking communities, linguistic attitudes towards the Puerto Rican sociolinguistic dialect, and the existence of lambdacism within their linguistic repertoires. In the middle of each interview session, subjects were asked to read a list of 10 words structured around phrases such as "Digo **puerta** para tí" or "Digo **amor** para tí" where the bolded words were changed to provide a context in which lambdacism can occur. After having collected all the data, Praat was used to analyze F3 and F4 of the 10 tokens produced by each participant (for a total of 40 tokens). The decision to measure F3 and F4 from the different tokens stemmed from a preliminary test I conducted prior to the experiment. In this test, I examined what formants, as the concentration of acoustic energy, determine variability while performing lambdacism. In this experiment, I pronounced the word "puerta" as [pwélta] and [puérta]. Upon analyzing both productions, it was found that F1 and F2 did not exhibit noticeable variability or distinction. However, variability was observed in F3 and F4.

6. RESULTS

6.1. Background information

Four participants were recruited to participate in this pilot study. All of them identified as women and were born and raised in Puerto Rico. The four speakers have been in the United States for more than five years (although not all of them have been living in North Carolina for the same amount of time). Three of them identified as bilinguals, and one as monolingual (participant four). The three of them that identified as bilinguals work as teachers in different elementary schools, whereas participant 4 works at a restaurant.All participants reported normal hearing and speech and mentioned having exposure to both Spanish and English on a daily basis. Figure 1 provides the gender, age, years of exposure to Spanish (from other Spanish speaking communities) in North Carolina, and typical daily use of Spanish and English.

Participant #	Biological Sex	Age	Years of Exposure to Spanish from other communities of speech in NC	Typical daily use of Spanish (in hours) per day	Typical daily use of English (in hours) per day
1	Female	37	7	11	2
2	Female	40	15	13	2
3	Female	38	12	12	3
4	Female	44	10	14	2
Mean	*F*	*39.7*	*11 (y)*	*12.5 (h)*	*2.25 (h)*

Figure 1: Background Information

6.2. Acoustic Analysis

Each participant generated 10 tokens and showed variability in the articulation of syllable final liquids (refer to Figures 2 and 3 for visual representations of waveforms and spectrograms, illustrating the production of the /r/ in two participants across two target words).

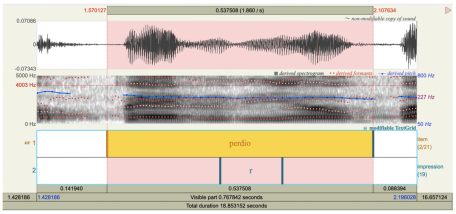

Figure 2: Target word: “perdió” – participant 2

In Figure 2. the waveforms of participant 2, which can be identified on the first row, show variability compared to those found in participant 3. Although the target words are not the same for both participants, both could be lateralized. Participant 2, in this case, opted to produce a tap sound /r/ , whereas participant 3 chose to lateralize the /r/ : [pwélta]. Notably, the space allotted for /r/ production in participant 2 shows two “furry” areas in the waveform, whereas in participant 3, a “flatter” pattern is evident, resembling the appearance of an /l/ sound. In regard to the spectrogram, which can be observed in the second row in both speakers, participant 3 exhibited a more fluctuant behavior in her F3 and F4 when lateralizing the /r/ sound, whereas in participant 2, it can be detected a more “stable” pattern in both formants. This may also suggest a method for identifying lateralization processes through the use of spectrograms.

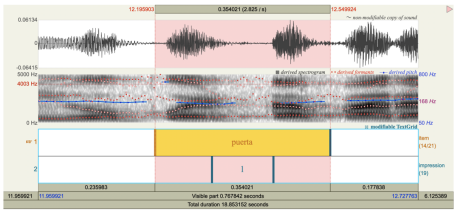

Figure 3: Target word: “puerta” – participant 3

During the four interviews, each participant showed different behaviors while lateralizing the /r/ sound. Participant 1, for instance, did not lateralize any of the /r/’s (she opted to produce taps in every token). Participant 2, on the other hand, lateralized every /r/ sound in each word. Participant 4 also lateralized most of the /r/ sounds, whereas participant 3 showed almost equal production of taps and syllable final liquids. See Figure 4. for a better understanding of the lateralization processes and production of taps in every participant.

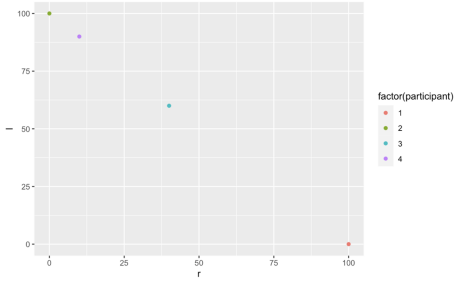

Figure 4: Production of taps /r/ and /l/ in percentages per participant

The average values of formant trajectories were

also examined to observe the production of F3 and F4 in each participant. Figure 5 illustrates the production of F3 in each subject (in Hertz), while Figure 6 depicts the analysis of F4 production.

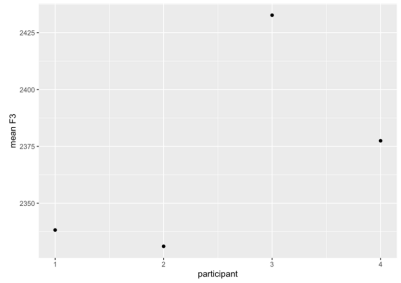

Figure 5: Mean of the concentration of acoustic energy in F3

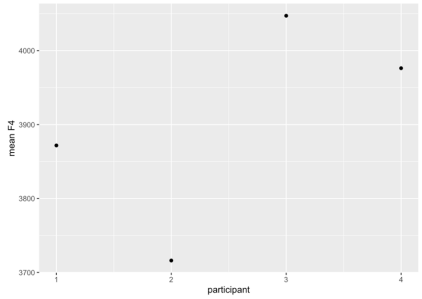

Figure 6: Mean of the concentration of acoustic energy in F4

Overall, participant 3 and 4 showed more concentration of acoustic energy in formants 3 and 4. Participant 2, on her side, showed the lowest production of acoustic energy in both formants. Participant 1 exhibited almost the lowest F3 and F4 out of the four speakers. See also Figure 7. to observe the space plot (a graphical representation of data points) of formants 3 and 4 in every participant considering the production of individual tokens. In this last graph, it is relevant to note that there is more consistency in some productions (participant 2 and 3), while others show more variation (participant 1).

7. DISCUSSION

The results of this pilot study, surrounding four Puerto Rican women living in North Carolina, reveal intriguing patterns in their sociophonological behavior, negotiation of identity, and responses to social dynamics when immersed in a multilingual context.

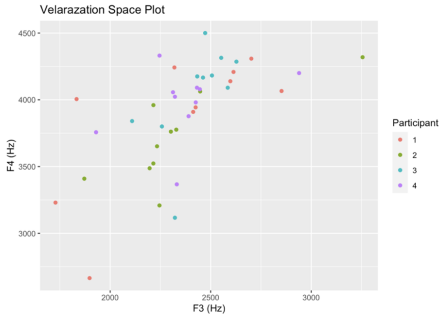

Figure 7: Mean of the concentration of acoustic energy in F3 and F4

Considering the acoustic analysis, each participant showcased variety in the articulation of syllable final liquids. Figures 1. and 2. explain these variations through waveforms and spectrograms, highlighting differences in articulation strategies across participants and target words. Participant 1, for instance, steadily produced taps: /r/, while participant 2 consistently lateralized /r/ sounds. Participant 4 showed a similar trend to participant 2, whereas participant 3 exhibited a more balanced production of taps and syllable final liquids. It is important to note that this variability depends on positive and/or negative experiences within their contexts. During the interview, participant 1 mentioned that when she reads sentences out loud, her teaching role would come out, and that there was no room for lateralization. Participant 4, on the other hand, did not show any lateralization during the first couple of words, but then felt a little bit more "confident" (she mentioned it after having read the target words) and started transforming the /r/ sounds into /l/ sounds. These results match with the hypotheses stated earlier in the document. Alongside with the previous ideas, analyzing formant trajectories revealed remarkable insights into acoustic energy concentration. While participants 3 and 4 exhibited higher concentrations in formants 3 and 4, participant 2 displayed the lowest energy production in both formants (see Graph 4.). This mechanism of comparing F3 and F4 through Praat, if expanded and/or studied with more participants, may suggest a method for identifying lateralization processes through the use of spectrograms.

8. REFERENCES

- Alba, Orlando. (2016). Una Mirada Panorámica al Español Antillano. Books. 10. https://scholarsarchive.byu.edu/books/10

- Carroll, K.S., Rivera, R.L., Santiago, K. (2015). Questioning Linguistic Imperialism: Language Use and Needs in a Puerto Rican Agriculture Program. In: Fabricius, A.H., Preisler, B. (eds) Transcultural Interaction and Linguistic Diversity in Higher Education. Palgrave Macmillan, London. https://doi.org/10.1057/9781137397478_8
- Domínguez Rosado, B. (2015). The Unlinking of Language and Puerto Rican Identity: New Trends in Sight. Newcastle upon Tyne: Cambridge Scholars.Eckert, P. (2019). The limits of meaning: Social indexicality, variation, and the cline of interiority. Language 95(4), 751-776.https://doi.org/10.1353/lan.2019.0072.
- González-Rivera, M. & L. A. Ortiz López. (2018). El español y el inglés en Puerto Rico: una polémica de más de un siglo. Centro Journal, 30(1), 106-131.
- Hespos SJ, Piccin TB. To generalize or not to generalize: spatial categories are influenced by physical attributes and language. Dev Sci. 2009 Jan;12(1):88-95. doi: 10.1111/j.1467-7687.2008.00749.x. PMID: 19120416.
- Kaushanskaya M, Blumenfeld HK, Marian V. The Language Experience and Proficiency Questionnaire (LEAP-Q): Ten years later. Biling (Camb Engl). 2020 Nov;23(5):945-950. doi: 10.1017/s1366728919000038. Epub 2019 Apr 15. PMID: 33628083; PMCID: PMC7899192.
- López Morales, H. (2004) "Situación actual del español en Puerto Rico". En: El español en el mundo. Anuario del Instituto Cervantes, 253-276.
- López Morales, H. (1983). Estratificación social del español de San Juan de Puerto Rico [Portada no disponible]. México: Universidad Nacional Autónoma, Instituto de Investigaciones Filológicas. ISBN: 968-837-136-X.
- Malavet, P. A. (2000). Puerto Rico: Cultural Nation, American Colony. Mich. J. Race & L., 6, 1.
- Oliver Rajan, J. (2022). El español de la zona cafetalera de Puerto Rico y sus narrativas orales como expresión identitaria. Borealis – An International Journal of Hispanic Linguistics, 11(2), 95–111. https://doi.org/10.7557/1.11.2.6435
- Ortiz López, L. A. (2022). El español en Puerto Rico. In Dialectología hispánica / The Routledge Handbook of Spanish Dialectology (1st ed., pp. 15). Routledge. https://doi.org/10.4324/9780429294259
- Schmidt, J. R. (2014). The Politics of English in Puerto Rico's Schools. [Copyright © 2014]. ISBN: 978-1-935049-94-4
- Schneider, A. M. (2013). Breves consideraciones sobre el sistema colonial en Puerto Rico. Revista História: Debates e Tendências, 13(1), páginas 91-99.
- Wardhaugh, R., & Fuller, J. M. (2021). An Introduction to Sociolinguistics. (8 ed.) Wiley.