

**Processing of /r/ Lateralization in Spanish and the Effects of Dialectal
Experience in a Lexical Decision Task**

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0. Abstract

The Caribbean varieties of Spanish have long been marginalized, with many aspects of Caribbean Spanish (i.e. /r/ lateralization, /s/ deletion, intervocalic /d/ deletion, /l/ rhotacization, among others) socially stigmatized within the Spanish speaking community (Carter & Callesano, 2018). However, there has been little to no investigation into the processing effects of these variations. Simply, while community members may have negative social connotations with these pronunciation variants, does their presence affect intelligibility and word recognition? Previous work has shown that there are a number of factors affecting lexical processing, including but not limited to, familiarity (Floccia et al., 2006), associativeness (Perea & Rosa, 2002), gender (van Berkum et al., 2008), experience (Sumner & Samuel, 2009), and others. This study aims to investigate how listener level of experience affects word processing of /r/ lateralization. /r/ lateralization is the systematic change from /r/ to [l] in coda position present in many varieties of Caribbean Spanish. /r/ lateralization is arguably one of the most salient features in Caribbean varieties of Spanish. Despite its commonplace occurrence, it is stigmatized across Spanish communities, often deemed a pronunciation error. To assess how listeners perceive this variation at the word level, in this study, I employ a lexical decision task to have listeners judge the lexicality of words excluding and including this variation. Afterwards, the participants are asked questions regarding their varying experiences with Caribbean varieties of Spanish. There was no direct evidence that dialectal experience affects speech processing, but the results show large individual differences in /r/ lateralization.

Keywords: speech processing, lexical decision task, dialect experience, language variation, caribbean spanish

1. Introduction

Listeners are faced with a wide range of phonetic variation in everyday language processing. There is evidence that listeners may encode certain kinds of information to aid in speech perception and word recognition. For example, listeners use prior knowledge about speech patterns to aid in online speech processing, and this could be cues such as general patterns in an accent or dialect, to speaker specific patterns. Perea and Rosa (2002) looked at the effect of associative and semantic priming in lexical decision tasks, and found that semantically related words prime each other, that is to say that when a word is said, words with a similar meaning are mentally activated. In a classic paper, Mullennix, Pisoni, & Martin (1989) examined talker variability on perceptual identification and auditory repetition naming tasks. They found that talker variability is a factor in speech processing, and listeners have mechanisms for dealing with it, but these mechanisms also come with a “cost” (i.e. incorrectly processing the speech, or taking longer to process speech). However, there is also the use of language processing studies in the clinical space as well looking at the effects of Parkinson’s disease on speech processing, highlighting the benefits of deep brain stimulation in intelligibility (Knowles et al., 2021). Moreover, many studies have found sociolinguistic factors in speech processing, such as, sexual orientation (Munson & Babel, 2007), gender and stereotypes (van Berkum et al., 2008), accented speech (Floccia et al., 2006, Munro & Derwing, 2006, & van Wijngaarden, 2001), and ethnicity (Wong & Babel, 2017, Hernandez & Sumner, 2022, & Babel, 2022). Speech processing is not only reliant on internal cognitive factors, but also on external social factors. In other recent studies, researchers look at how listeners adjust their speech processes based on expectations in the speaker’s speech patterns. Listeners will have certain expectations of a speaker’s vowel space based on the presumed size of a speaker (Barreda, 2020). In the same way, listeners encode

speaker specific attributes in their speech processing, making it harder to switch in between speakers (Clapp et al., 2023). Whether listeners have implicit or explicit (Vaughn, 2019) knowledge about a speaker's speech patterns, listeners will use this information to aid in the processing of the speaker's speech.

Beyond encoding information, experience with variation has also been shown to aid in speech processing. Sumner and Samuel (2009) use a primed lexical decision task to understand how listeners encode different dialectal variations of lexical items, and how listeners accommodate these variations based on exposure to the dialect. In this experiment, they tested speakers of General American (GA) and New York (NY) accented English on the processing of [ɔ̃] word-finally in GA English against the [ə] in NY English (e.g. "baker", NY: [beɪkə], GA: [beɪkɔ̃]). They divide the participants into three groups: Covert-NYC (New York City), Overt-NYC, and GA. Both the Covert- and Overt-NYC were listeners from New York City differing in [ɔ̃] and [ə] production respectively; GA were listeners that were not from New York and did not use [ə] variant in their production. They examined the priming effects of these two variants across three experiments, and the three groups of listeners. In the first experiment, they looked at the reaction times of NY and GA primes with NY and GA targets with related and unrelated items (Prime-Target: GA-GA, NY-GA, GA-NY, & NY-NY). They found that for both the Covert- and Overt-NYC participants, there were some priming effects in all conditions, with significantly higher effects in the within-dialect GA-GA and NY-NY conditions. In contrast, priming effects were only found for GA participants when the *target* was a GA variant. Both the NYC groups exhibited priming effects with NY primes, which shows that they have robust phonological representations for the NY variants, whereas the GA participants do not. In the second experiment, they looked at semantically-related primes but the target did not include the

[ə] or [ɚ] variant (e.g. “slender” [slɛndə]/[slɛndə] - “thin” [θɪnə]/[θɪnə]). Using the same within and cross-dialect conditions as the previous experiment, they found that both NYC groups were primed in all conditions once again, but the GA group was only primed by primes with the GA variant. The final experiment probed differences in long-term priming; finding that only the Overt-NYC group was primed by the NYC variant, whereas the other groups were only primed by the GA primes. From this, Sumner and Samuel argue that dialect production does not always equate to perception and representation, experience plays a role in lexical processing, and that variants that are not marked by region are generally more beneficial to lexical processing. The important note to take away in regards to this study is that dialectal experience facilitates the lexical processing of a variant.

1.1 Social Contextualization of /r/ Lateralization

Particular pronunciation variants may also be socially stigmatized, as is the case with NYC accents (Sumner & Kataoka, 2013). While social preferences do not always affect speech processing (Babel et al., 2019), understanding the social context of phonetic variation will allow for a better understanding of the exposure to variation. This may be the case with various Caribbean varieties of Spanish (Dominican Republic, Cuba, Puerto Rico, & Venezuela) that demonstrate /r/ lateralization. This variation is systematic in the varieties in which it occurs, as it only happens in coda position. For example, the word *puerta* “door” in other varieties could be pronounced [pwer.ta], whereas some Caribbean speakers would also say [pwel.ta]. The lateralization is generally associated with Caribbean varieties of Spanish, and within these communities there are specific regional and social connotations with its use (Díaz-Campos & Willis, 2021, & Meggeney, 2002). In a study conducted with the Hispanic community in Miami, Florida, Díaz-Campos & Willis assessed the personality characteristics, patterns of language use

(how likely this person is to learn English), perceived employment, income, and family background of different Hispanic accents. Caribbean varieties were ranked as less prestigious in all categories compared to other Latin American and Iberian varieties. Iberian varieties were consistently ranked most positive in almost all categories (Carter & Callesano, 2018). The “patterns of language use” category is particularly applicable to the present study. Caribbean varieties of Spanish have largely been looked at as nonstandard and have been marginalized as a result. This has pedagogical and social repercussions; the Spanish typically taught to Spanish learners is that of Spain or Mexico. Moreover, there is comparatively little representation of Caribbean varieties of Spanish in the linguistic literature compared to other varieties. Despite this lack of institutional support, Caribbean Latin music brings the regional Spanish accent to popular culture in a way that is generationally skewed. This offers a natural window into how exposure to Caribbean Spanish varieties affects potential generational changes in the perception of these varieties.

In the psycholinguistic space, there is little to no work on marginalized varieties of Spanish. The importance of representation in linguistics is often undervalued; when building theories, it is often that investigators use a standard dialect of a language, which leaves out different potential effects that are language or dialect specific, or that could be due to the circumstance surrounding particular varieties. With this, it is important to investigate psycholinguistic questions outside of the standard. The present study investigated the perceived lexicality of /r/ lateralization using a lexical decision task. Afterward, participants were asked to complete a dialect experience questionnaire to account for the various effects on speech processing mentioned before. Based on the aforementioned literature, it is expected that participants with more experience with the dialects using this variation will more consistently

identify items with this variation as words (e.g., labeling [pwel.ta] as a word, not a nonword) . Moreover, with the increasing popularization of Caribbean musical artists, it is plausible that people who listen to Caribbean artists regularly will also judge these variations as lexically sound.

2. Methods

2.1 Participants

53 people participated in this study. Participants were L1 and L2 Spanish speakers from varying regional and dialectal backgrounds. Participants were recruited through personal networks, such as, online group chats, Facebook groups, and through school clubs. This study was also open to undergraduate students at the University of British Columbia (UBC) and at University of California - Santa Cruz (UCSC).

2.2 Stimuli

The lexical decision task contained 4 distinct types of stimuli: critical words, control words, filler words and nonwords. All words were 2 or 3 syllables long. Critical words were words that canonically have an [r] in coda position, but then are lateralized to an [l] (e.g., [pwelta], *puerta*, *door*). The control words were words that kept the canonical [r] in coda position (e.g., [pwerta]). Fillers were words or nonwords without any /r/ or /l/ in coda position. Nonwords were phonologically licit words, but had no semantic meaning. In total there were 200 stimuli: 10 critical, 10 control, 80 filler words, and 100 filler nonwords (refer to Table 1). All words were recorded by the author in a lab setting using Audacity. All stimuli were mean RMS amplitude normalized to 70 dB in Praat in a manner that ensured no samples clipped (Boersma & Weenink,

2023). The sound files were originally recorded as .wav files but were converted to the .ogg Vorbis file format to function better in an online environment.

Table 1: Stimuli breakdown

Control	Critical	Filler Words	Filler Nonwords
10	10	80	100

2.3 Procedure

The experiment was designed and delivered using the online experiment software *Gorilla* (Anwyl-Irvine, Massonnié, Flitton, Kirkham & Evershed, 2019; <http://www.gorilla.sc/>).

Participants completed the experiment through a Google Chrome browser. Participants were presented with a consent form, to which they gave or did not give consent. If they gave consent, they went through a headphone check, to which they had two attempts to pass (Woods, Siegel, Traer, & McDermott, 2017), then led to the task. If participants did not pass the headphone check they were still allowed to participate in the experiment, but were excluded from the analysis.

The lexical decision task (Meyer & Schvaneveldt, 1971) required participants to identify each item as a word or nonword. Participants were told that they will hear a sound file, and were instructed to press 1 if they thought the item was a word and 0 if they thought the item was a nonword. There was a counter-balanced version of the experiment where the button order was reversed (1 for a nonword and 0 for a word). Participants had 3 seconds to respond to the item, and a timer was displayed at the top of the screen during the trial counting down from 3 seconds. If there was no response after 3 seconds, no response was recorded and they were sent to the next trial. The task began with 5 practice trials containing filler words and nonwords. The participants were given three self-timed breaks throughout the task.

After the lexical decision task, participants were asked to fill out a questionnaire about their experiences with dialects where /r/ lateralization is present, which for the sake of this experiment included Puerto Rican (Matluck, 1961), Dominican (Díaz-Campos & Willis, 2021), Venezuelan (Lo Ponte Pérez, 2016), and Cuban (Alfaraz, 2008) Spanish. Participants were asked if their first language was Spanish. After that, they were asked a series of questions about their dialect. Participants were asked for their place of birth, the neighborhood they were born in¹, the dialect(s) they most identify with, if they speak other languages other than Spanish, age, where they have lived other than their place of birth, and, if they listen to music in Spanish, who their top three Spanish musical artists are. The same questions were then asked about each of their parents, as well as, how long they have lived with each parent.

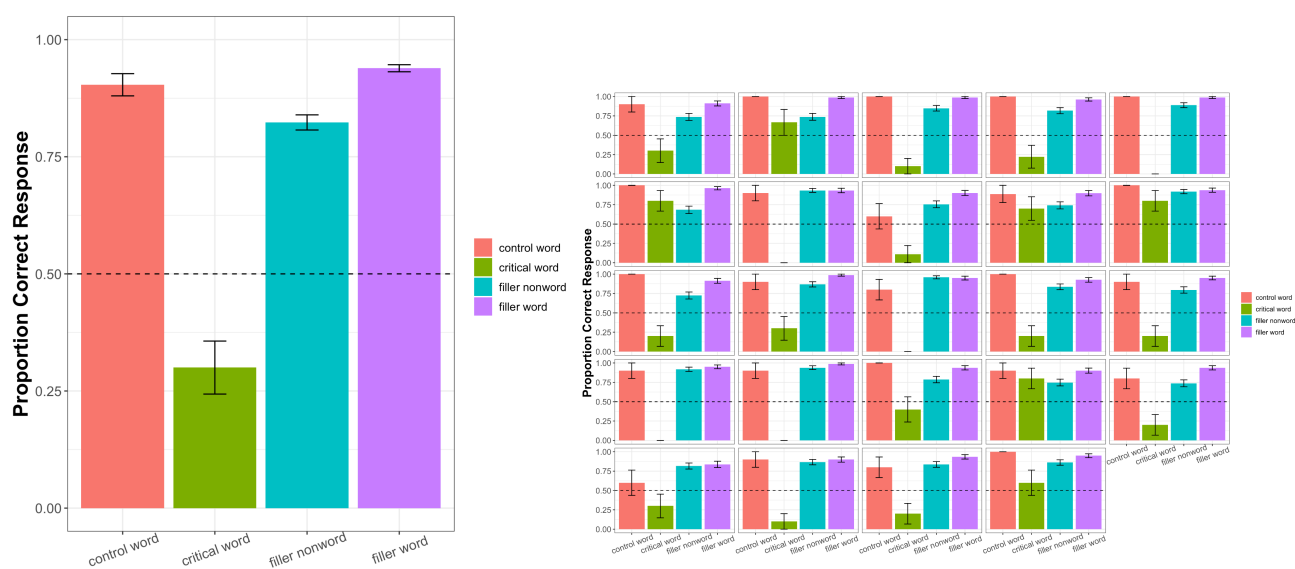
Participants were then asked about their experience with Spanish dialects. They were asked to rank the following dialects based on their ability to understand them: Central American, United States, South American, Caribbean, and Castilian Spanish. After this, they were asked questions about the dialects that using the /r/ → [l] variation. They were also asked how often they interacted with each of these dialects from a scale to never to everyday, and with whom or where they use any of these dialects. Finally, the participants ranked their ability to understand each of these dialects from 1 (I cannot understand this dialect) to 10 (I understand this dialect perfectly). A translated version of the questionnaire is available in the Appendix. For students, a language background questionnaire was available in addition to the dialect experience questionnaire at the end of this study. The consent form, and the instructions were all in Spanish.

¹ Within countries that have lateralization, there are certain areas that are more likely to have people that lateralize

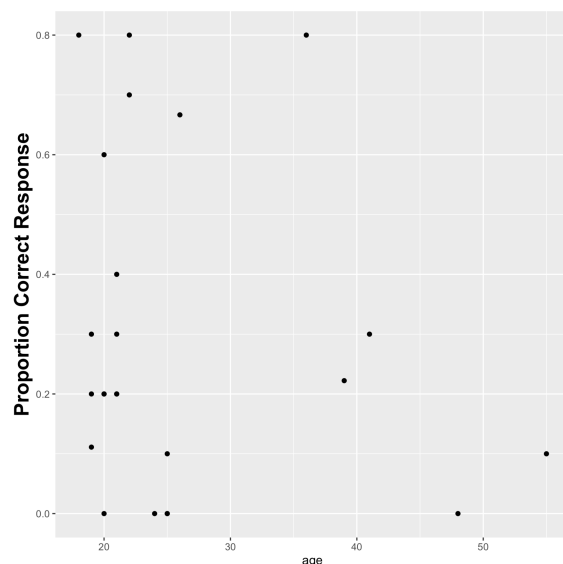
3. Results

Responses and response time were analyzed. Critical items were coded such that a “correct” response would be the application of word label, whereas calling a critical item a nonword would be “incorrect”. The word decision judgments were recorded for all trials. Participants who scored less than 80% accuracy in the filler words and nonword trials were excluded from the analysis (5% stricter than Soo & Monahan, 2023, stricter due to the presence of L2 speakers). This filters out participants who may not have been paying attention, as well as, some L2 Spanish speakers who may not have as large of a lexical inventory or more limited Spanish experience. Before filtering, there were 53 participants; after filtering, there were 24 participants.

Overall accuracy scores were calculated for each trial type, and then divided by participant. Evaluating the scores at the individual level show a lot of cross-participant variability in the lexicality judgments in critical trials. The green bars represent critical trials.



The age graph once again shows a lot of variability in individual scores even when presented by age. Most of the participants lie below the age of 30, and show no clear pattern within that group. For the participants over 30, the accuracy scores seem to decrease with age, however, there is not a substantial number of participants within the group, so it is difficult to conclude that there is a trend here. A more spread



data pool in regards to age would be useful here to understand just how age could affect the accuracy of participants. The accuracy scores of critical items were broken down according to the reported musical artists: musical artists that engage in /r/ lateralization in their songs, and those that did not. Importantly, not all Caribbean artists exhibit /r/ lateralization in their music. However, all participants who reported artists that had this variation always reported “Bad Bunny” as one of their most listened to artists, who does have /r/ lateralization in his speech. Listeners who did report listening to Caribbean artists with /r/ lateralization had identified the critical items as words 41.11% of the time, compared to the 22% word identification rates for critical items from participants who did not report listening to Caribbean artists. Both groups, however, show low accuracy to the critical words compared to the fillers which are all <80%, though the lateralized group show a slightly higher percentage.

Next, the accuracy scores of critical items were broken down according to dialectal experience.

Table 2: Frequency of Interaction and Mean Accuracy on Critical Words

	Never	1/month	1/week	>1/week	Daily	Unknown
Dominican	24.83%	31.03%	80%	-	70%	25.64%
PR	30%	34.76%	-	-	-	25.64%
Cuba	28.67%	28.95%	-	-	70%	25.64%
Venezuela	26.67%	10%	80%	80%	20.69%	34.69%

In the table above it shows the mean accuracy scores with the reported frequencies in the dialect experience questionnaire; the leftmost column refers to the dialect the participant is exposed to. There are quite a number of empty cells where no participants reported that frequency. The reported frequencies for Dominican and Venezuelan Spanish speakers seem to be the ones with more variability in the frequency of interactions. Both Puerto Rico and Cuba do not have enough spread in the frequency data to come to an evidence-based conclusion. Based on the data shown here, it seems that the accuracy scores increase if a listener interacts with a Dominican speaker more; that is, they are more likely to judge these critical items as lexical. The Venezuelan data is a bit more variable and does not show a clear pattern. Age was also accounted for in the analysis. However, there does not seem to be a clear pattern in the data in relation to age.

3.1 Bayesian Analysis

Two Bayesian models were run on the accuracy data (Bürkner 2017) using a Bernoulli family distribution since the responding variable is binary. Both models were run with weakly informative priors and the results are given in log likelihood. The first Bayesian model was run to assess the correlation between control vs. critical trials and the proportion of word judgments.

The intercept estimate, CrI, and estimated error are 2.69, [2.02, 3.42], and 0.36 respectively, which represents control trials. For critical trials, the estimate was -3.77, with an estimated error of 0.33 and a CrI of [-4.44, -3.13]. This means that overall listeners were less likely to judge the critical items as words when compared to the control items. For the second Bayesian model, only critical trials were analyzed. Interactions in Dominican frequency (quantised from 1 to 5, 1 being never and 5 being everyday to show a quantitative analysis of the amount of interaction as a factor in lexicality judgment), age, and musical artists (TRUE if participant listens to an artist that lateralizes, FALSE if not) participant; random intercept with participants and random slope for musical artists | word. The model syntax was: $\text{Correct} \sim \text{Dominican Frequency} + \text{age} + r_artists + (1 + \text{Dominican Frequency} | \text{Word}) + (1 | \text{Participant})$. There were no divergent transitions and the Rhat values were all less than 1.01. The β estimates, 95% Credible Interval (CrI), and estimate error are reported here. The intercept estimate, CrI, and, estimated error are -1.39, [-4.36, 1.39], and 1.45 respectively, which represents a listener who never interacts with Dominican speakers, are at age zero, and do not listen to an musical artist that uses /r/ lateralization. None of the interactions provided evidence for predicting lexicality judgments. The Dominican frequency effect estimate was 0.67, with an estimated error of 0.46 and a CrI of [-0.19, 1.61]. Age had an effect estimate of -0.04, with an estimated error of 0.05 and a CrI of [-0.13, 0.05]. Finally, listening to a musical artist that has lateralization had an effect estimate of 0.67, an estimated error of 0.97, and a CrI of [-1.20, 2.60]. The model showed that all these estimates had a 95% CrI that included zero, meaning that it does not provide evidence for these three variables having an effect on the probability of a listener judging the critical items as lexical.

4. Discussion

The results presented show little to no evidence for dialectal experience affecting whether the critical words, which exhibit lateralization of /r/, are identified as words. This contradicts the hypothesis stated in the introduction that listeners with more experience with these varieties with /r/ lateralization will be more likely to judge the critical items as words.

There are several possible explanations for the lack of an effect. One possibility is that people are unlikely to identify lateralized items as words because of different perspectives on what Spanish dialect is “standard”. A second possibility is that there is no acoustic evidence for the listener to expect these phonological patterns in the stimuli. Finally, because /r/ lateralization is not present in all varieties of Dominican, Cuban, Puerto Rican, and Venezuelan Spanish, it could be that the participants have not interacted with speakers that use this variation specifically. These three explanations could provide context for the null effect in this study, and could provide different avenues into future work in this area. This discussion will focus on the explanation and critical reflection surrounding these three points.

Many languages have a variety that is considered the standard of the language. The standard variety is frequently used in pedagogical institutions and is considered to be the most “correct”. Because of this, there could be processing costs to dialects or accents that deviate from the standard. Specifically with regards to the Spanish space, the orthographic form is relatively transparent in its acoustic realization. The faithfulness to the written form is likely to be correlated to how standard a variety is. That is to say that, when there is lateralization, it is seen as wrong because it is orthographically represented as “r”. So, because of this deviation from the orthographic form, the listeners may not accept lateralized words as words.

As mentioned in the introduction, there are certain connotations with speakers of Caribbean dialects of Spanish (Carter & Callesano, 2018). There are two reasons why this may affect the labeling of the items with /r/ lateralization as words. People who do not live in regions with this variation may not be exposed to it as much, and are probably more exposed to more standard varieties of Spanish. More standard versions seen more in academic settings, which could affect what dialects of Spanish L2 learners are exposed to. If a listener is exposed to a variety less often, or not at all, they are less likely to have a phonological representation for the words said in this variety (Kleinschmidt & Jaeger, 2015, Sumner, 2011, & Sumner & Samuel, 2009). This would cause the listener to not be able to associate this phonological form to an item in their lexicon and thus not judge it as a word. Although this could account for a lot of the listeners, there were a number of listeners that were from Caribbean regions who did not score as high in the lexical decision task critical items that theoretically should have been exposed to lateral dialects. If this was true, then these listeners should score significantly higher than those who have had less experience. Another reason may be that people know of these varieties, but are consciously avoiding judging the critical items as a word because it does not fit the standard pronunciation. Both in the L1 and L2 language teaching settings, a standard form of Spanish is taught, often disregarding any other deviating dialect, whether it be implicit or explicit. Because of this, although people may have been exposed to a dialect, they may be less inclined to judge words in these dialects as words. If a listener is taught that a certain dialect is the correct representation of a language, they may not process other dialects as correct as well, even if it does not interfere with intelligibility. The social circumstances of a dialect may affect the processing of said dialect. This could account for some of the variability found in the results here. Since social perceptions of Caribbean dialects were not collected from listeners in this

study, it cannot be determined if this offers explanatory power for the results. Although, for example, it has been shown that social evaluations do not block perceptual learning (Babel et al., 2019), this could vary based on language circumstance. Because the social dynamics of Spanish are different from English, it could be that Spanish listeners' social evaluations affect more levels of speech processing.

In a less sociolinguistic approach to the data, listeners could not be judging the critical items as words because they are not making the cognitive preparations to process these items because there is no reason for them to do so. Previous linguistic literature has shown that listeners will adjust their cognitive processes to account for speaker-specific speech patterns (Clapp et al., 2023, & Mullenix et al., 1989). In addition to this, listeners have been shown to be able to generalize patterns from speech to future speech (Weatherholtz, 2015). Because speakers who lateralize generally do so consistently, instances of no lateralization could be an indication to the listener that the speaker does not lateralize and thus do not employ phonological mappings in critical items. Before participating in the task and while completing the task, there is no indication that listeners should expect /r/ lateralization. That is to say that there are no other acoustic cues for the listener to assume a Caribbean dialect from the stimuli and because of this, the listener may see this lateralization as not part of the speech patterns and then not access the phonological access needed to process the word as lexical. The stimuli, although produced by a heritage speaker of Venezuelan (Caracas) Spanish, do not necessarily carry enough acoustic evidence in single word utterances for the speaker to expect lateralization. Moreover, there is evidence within the stimuli to directly contradict expectations for /r/ lateralization. The control items in this experiment are all words that have potential for /r/ lateralization, but retain the /r/. To the listener, this could be construed as evidence that the lateralized items are nonwords.

Listeners rely on knowledge of a speaker's speech patterns to better process their speech, and have certain assumptions of speech patterns based on the speaker's perceived accent. So, if the participant is not getting any input from the speaker that they are a speaker of Caribbean Spanish, then the participant will be processing their speech differently than if otherwise, even if the listener has substantial experience with a Caribbean dialect. This invites discussion into what exactly a lexical decision task is meant to investigate. Lexical decision tasks are meant to evaluate a participant's lexicality judgements of words, but the operationalized metalinguistic concept of lexicality may be subjective to the listener. A word to one person may be something they understand, while a word to another person may be a standard variation of a lexical item. Presenting words without any context may not be investigating the actual real-world processing of these items. It is not inherently the case that presenting speakers with the critical words within an utterance will result in the speaker not understanding said utterance. From my perspective, rather than investigating the actual processing of these words, lexical decisions tasks investigate the base phonological representation of a word, that is to say, the default phonological representation without any adjustments to a speaker's speech patterns. This is an important distinction to make as to not make assumptions of the intelligibility and acceptance of these dialects in the Hispanic community. If anything, this study emphasizes the point that word judgments are highly specific to the listener, and an investigator should not make conclusions based on the materials, but based on the listeners. The listeners will not activate all phonological representations in their lexicon at all times (i.e. A speaker will try to identify what phonological mappings to use based on the speaker, and will not have all phonological mappings in their repertoire ready when speaking with someone). For this, listeners rely on acoustic and/or social cues, to activate certain phonological representations. However, this does not happen for accents

they do not know because they have not developed the accent-specific mappings to facilitate processing.

The third possible explanation offers a more simple reason for the lack of word judgements on critical items: the participants have not been exposed to dialects that exhibit /r/ lateralization. Although there are some participants who reported having frequent interactions with Caribbean speakers, there is still no evidence that this increases the probability of judging critical words as words. Although /r/ lateralization appears, for the most part, in Caribbean dialects, it is not present exhaustively across all Caribbean dialect, and is often attributed to region specific patterns. This would account for the unexpectedness in the results with participants who frequently interacted with Caribbean speakers.

5. Conclusion

Speech processing has been a long investigated topic in the psycholinguistic literature and yet there are many questions to be answered. There have not been a substantial number of studies in Spanish speech processing, especially in underrepresented dialects. Cognitive speech processing mechanisms allow for the understanding of speech even if the speaker's speech patterns are novel to the listener. In this lexical decision task there is little to no information about the speaker's speech patterns; in fact, there are inconsistencies within the stimuli that could contradict any generalizations that the listener is making. Because of this, it is not necessarily sound to make conclusions about the actual processing of /r/ lateralization. Rather, this study shows that participants' access to the phonological representation of this variation do not vary with experience, and have other factors influencing it. This contradicts what had been discussed in the introduction, possibly due to language-specific patterns in speech processing. Because of

the large amount of individual variation that is unexplained by the data collected in this study, more research is needed to examine how phonetic and phonological variation in marginalized varieties of Spanish are processed by listeners with and without the relevant dialect experience. Dialectal experience has shown in this study not to be a predictor in the word judgments of lateralized words. More investigation into marginalized varieties of languages could provide insightful knowledge that would help build theories and allow for more representation in the linguistic literature.

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