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Rost Bagudanch, Assumpció. «Variation and phonological change : the case of 'yeísmo' in Spanish». *Folia Linguistica*, Vol. 51 Núm. 1 (2017), p. 169-206. 38 pàg. DOI 10.1515/flin-2017-0005

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VARIATION AND PHONOLOGICAL CHANGE.
THE CASE OF *YEÍSMO* IN SPANISH¹

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Abstract: Recent studies on sound change suggest that change is not possible without allophonic variation, since it seems to be the triggering factor in phonetic evolution (see Lindblom 1990a, 1990b, Ohala 1974, 1993, 2013 or Blevins 2004). When focusing on Spanish *yeísmo*, recent research draws attention to the fact that it is a change in progress (see Moreno Fernández 2005). Since the beginning of the 20th century, /ʎ/ has been gradually merging with a palatal phoneme, traditionally considered as a fricative consonant in spite of its formantic structure. Nevertheless, in this process there is not a real dichotomy between a lateral and an approximant consonant. Instead, there is an array of allophones that concur as variants of /ʎ/ ([ʎ], [j], [ʝ] or [j̞]) are a few examples of them). Hence, this paper focuses on investigating the enormous variation in the phonetic representation of /ʎ/ and how it is evolving in the reorganization of the Spanish sound system which, obviously, has significant phonological consequences. This will be achieved by experimental means (analysing speech acoustically) and by the collection of data for different dialects, which will give us information about (i) the existence of intra and inter-speaker variation and (ii) how this variation functions. The results lead us to think of a restructuring of the palatal system of Spanish, at least in some parts of its linguistic territory, which seems to prove that the merger process is still progressing.

Keywords: Sound change, phonetic variation, Spanish phonetics, Spanish diachronic linguistics, *yeísmo*.

1. Introduction

Yeísmo, the phenomenon consisting in the gradual substitution of the phoneme /ʎ/ by the non-lateral /j/² in Spanish, has been a favourite topic of

¹ This research has been funded by grant no. FFI2011-24183 awarded by the Spanish Ministry of Education and Science. I would also like to thank Dr. Cristina Suárez and three anonymous reviewers for their helpful comments.

research in recent years (e.g. Clavería Nadal 1993; Chamorro Martínez 1996; Moreno Fernández 2005; Molina Martos 2006; García Mouton and Molina Martos 2012; Gómez and Molina Martos 2013; Rost Bagudanch 2014a; Martínez Celdrán 2015). It is an interesting phenomenon because it is a sound change in progress in Spanish, which gives us the opportunity to observe how sound change operates and how it interacts with social, geographical and psychological factors. It has also been possible to detect some parallelisms with diachronic changes in the evolution of Spanish, which makes it a very attractive topic not only for phoneticians interested in synchronic description but also for dialectologists or linguists concerned with historical grammar. Our main purpose here is to give an account of the phonetic motivation for this ongoing change and to determine the context of variation from which the change might have stemmed. Besides, one of our core questions is whether there are clear acoustic and perceptual differences between [ʎ] and [j], which is a key aspect to understand the confusion between them. With these objectives in mind, we decided to conduct a study that involves experimental phonetics and dialectal data collection, as will be described below.

The customary approach to *yeísmo* covers two main aspects: on the one hand, its dialectal description, i.e. its spread in the Spanish linguistic territory; on the other, the phonetic characteristics of specific realizations in particular areas. Most of the literature mentions the articulatory, acoustic and perceptive proximity between [ʎ] and [j],³ and leaves the explanation of the intrinsic causes of the phenomenon aside. Usually, the explanation of this proximity does not go beyond the idea of [j] being a less tense sound in the sense that it is produced with a lesser degree of constriction.

As a consequence, this paper adopts a novel approach to this issue by examining complementary views from different disciplines, as stated before. Thus, experimental phonetics will provide information about the acoustic features of possible allophonic variation, which explains the aforementioned “proximity”; and dialectal information will supply evidence of the scope of the different phonetic solutions and can suggest the way in which the change may progress. All these viewpoints will help us to understand the sound change under analysis.

The main goals of this paper are thus, first of all, to describe briefly the degree of variability in the realization of the palatal lateral phoneme, using acoustic analysis and dialectal data. An acoustic analysis will allow us to establish whether there is variation at an intra-speaker level, while dialectal data may give us information about variation between speakers from different geographical areas. This dialectal survey will be relevant because it will show whether different allophonic solutions are regionally

² We are following International Phonetic Alphabet (IPA) criteria in the transcription of the palatal approximant: since IPA offers a specific symbol for this sound, it is preferred to other possibilities.

³ See Quilis (1999: 314-315), Hualde (2005: 180) or RAE (2011: 220), for example.

determined or are common realizations irrespective of geographical area. In the latter case, we could speak of global tendencies probably related to phonetic contexts; in the former, of specific behaviours possibly associated with extralinguistic factors (i.e. language contact).

Secondly, we will try to determine whether the selection of the possible allophonic variants entails any alteration in the phonological system, which could throw light on the neutralization of the phonological contrast. Finally, we will use diachronic descriptions (particularly corresponding to the evolution of the Lj context),⁴ which offer an interesting parallelism with the synchronic situation, in order to provide information on the current phonological situation and to trace a possible direction of the change.

This paper is structured as follows: Section 2 includes a brief account of the necessary background to understand the phenomenon of *yeísmo* (§2.1) and phonetic variation and change (§2.2). The results for phonetic variation are presented in Section 3, with Subsection 3.1 on the results of the acoustic experiment and Subsection 3.2, on the dialectal data. In Section 4, the possible causes of the *yeísta* sound change will be discussed. Finally, the discussion will be presented in Section 5, which is followed by the conclusions.

2. Background

2.1 The phenomenon of *yeísmo*

Yeísmo has been described as a dephonologization process explained as a merger case in the sense described by Hay, Warren and Drager (2006: 458): “Merger is a process [...] in which sound change leads to the collapse of a phonemic contrast, so that what were previously two distinct phonemes in a dialect come to be realized as a single phoneme”. In other words, the /ɬ/ category disappears and becomes /j/, a process which entails a reduction in the number of phonemes. Indeed, as will be explained, *yeísmo* is affecting almost the whole Spanish system. According to Yu (2015), many sound changes such as this can be explained by perceptual confusion, because they may arise from misperceptions – errors in perceptual parsing caused by perceptual similarity. Whatever the ultimate reason for the merger is, for some authors (e.g. Hualde 2005: 180) it is reaching its end, while for others it is still in its initial stages in some regions (cf. Moreno Fernández 2005: 987), as will be explained below.

There has been much discussion about the nature of the segments implied in *yeísmo*, as well as of its geographical origin and its spread to other areas. From the beginning of the 20th century, the Spanish palatal

⁴ The phonetic evolution of Lj in Spanish, is known to be the following: [lj] _{lat.} > [ɬ] _{vlg. lat.} > [j] > [ʒ]/[dʒ] _{Med. Sp.} > [ʃ] _{16th} > [x] _{17th} (see Lapesa 1981: 167).

lateral has been gradually replaced by another palatal phoneme, traditionally considered a fricative consonant in spite of its formantic structure. Nowadays, more recent descriptions of the Spanish phonetic inventory refer to it as an approximant sound (see Martínez Celdrán 2015), at least in some regions of the Spanish linguistic domain. The most popular view is that *yeísmo* has spread from the Andalusian region (Lapesa 1964; Gómez and Molina Martos 2013), although other scholars (e.g. Corominas 1953) attribute its first occurrences to other peninsular areas, such as Aragon. In terms of chronology, there are also different opinions. Frago (1993) documents this phenomenon as already occurring in the 16th century, and some authors say that it dates back to the Middle Ages: Chamorro Martínez (1996), for instance, supports the idea of its 13th century origin, relying on evidence from some documents from La Rioja.⁵

When analysing this phenomenon, Moreno Fernández (2005: 984-985) assumes four stages in its evolution, as can be observed in Figure 1. The first phase corresponds to the distinction between /ʎ/ and /j/;⁶ the second, to the coalescence of lateral and approximant solutions, the latter being the more common choice. Thirdly, *yeísmo* would be the most widespread tendency but it would present different realizations depending on the degree of friction and the point of articulation. Finally, the fourth and last stage would be the stabilization of the process and the presence of fricative variants (*rehilamiento*).⁷ According to some scholars, Peninsular Spanish seems to be in the third stage (cf. Hualde 2005 and even RAE 2011).

⁵ For further details of this subject, see Corominas (1953), Galmés de Fuentes (1957), Alonso (1967). Corominas (1953) defends the existence of non-Andalusian spots of *yeísmo* in the last centuries of the Middle Ages in the Aragonese area. However, Lapesa (1964) maintains the idea of an Andalusian origin and Alonso (1967) situates it in the 18th century for Peninsular Spanish and the 17th century for American Spanish.

⁶ In fact, the author mentions that in this initial stage, the confusion between both phonemes would have started but the distinction was still maintained in some lexical units: he points to a lexical spread of *yeísmo*.

⁷ In the Hispanic tradition *rehilamiento* is the term often used to refer to certain fricative sounds, as Navarro Tomás (1934: 274) described it: “vibración relativamente intensa y resonante con que se producen ciertas articulaciones” [intense, resonant vibration that occurs with certain articulations]. Quotations and examples which are not in English have been translated by the author.

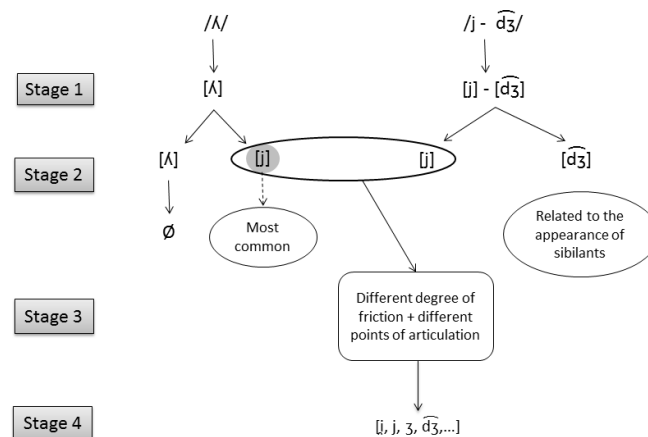


Figure 1. The four stages in *yeísmo* according to Moreno Fernández (2005: 984-985).

It is worth noting that in the process of *yeísmo* it is not clear whether there is an actual dichotomy between a lateral and an approximant consonant or not. Moreover, there seem to be a large number of allophones competing as variants of the palatal phoneme; Moreno Fernández (2005: 988) and Gómez and Molina Martos (2013: 9) mention the idea of a complex envelope of variation concurring in this phonological context.⁸

What seems clear is that the situation is not a homogeneous one. The change is progressing at different speeds in the different regions and in all the areas variation is present. So, according to Moreno Fernández (2005: 987), while Central America seems to be in stage 3, the Río de la Plata zone or Seville have reached stage 4; by contrast, Castile-and-Leon seems to be continuing in stage 1 and the most rural part of the Canary Islands is still in stage 2.

From a sociolinguistic point of view, the literature points to the idea of a bottom-up change, from the popular and middle classes to the upper classes, and this change is led by women. Another characteristic of this ongoing change is its spread from urban centres to rural areas: the merger is seen as a prestige mark by rural speakers. Rural areas are thus the most conservative and tend to keep the phonemic distinction to a greater extent than cities. With respect to social groups, as we have already pointed out, women are more inclined to adopt prestige behaviours as a class mark. Other generalizations (i. e. regarding age or level of education) need to be made with caution, since the situation in the different parts of the Spanish domain is very complex; Gómez and Molina Martos (2013: 9) point out that the change is diverse and has its own features in every Hispanic community.

⁸ See Navarro Tomás (1964) for a classical study of *yeísmo* variation.

2.2 Variation and sound change

In Subsection 2.1 we have seen that *yeísmo* is a complex phenomenon and, according to the literature, it has entailed variation in its different stages. Variation is indeed an important subject when referring to sound change. Recent studies on language change have shown that linguistic evolution appears to initiate with the existence of variation. In this sense, Lindblom's Hyper & Hypo-articulation theory (henceforth H & H theory) (see Lindblom 1990a), assumes that there are two opposite forces in language that interact depending on communication needs: the tendency to minimum articulatory effort in speech production (hypoarticulation) and another force that must assure perceptual discrimination⁹ (which leads to hyperarticulation). Success in communication entails an appropriate balance between the two. From this perspective, variation is one-dimensional: if output constraints dominate, hyperforms are expected, but if system constraints dominate, hypoarticulation is observed. In any case, the speaker will compensate his/her articulation gestures in order to obtain an acoustic equivalence with the target segments depending on the communicative situation. This is an adaptive behaviour which demonstrates the plasticity of sound production and perception.

Caravedo (2014) also argues that variation is the stage previous to sound change. She distinguishes between non-functional variation, which has no consequences at the lexical distinctiveness level, and functional variation, which implies an unfinished process of alteration in linguistic functions. In this case, the modification could involve a reduction in linguistic units, as occurs in *yeísmo*. In fact, she speaks of spaces of variability, a *continuum* which permits fluctuations in the phonetic realization of phonological units, always within certain limits that allow perceptual recognition.¹⁰ These fluctuations are recurrent in the same community and can constitute functional or non-functional variation, depending on whether they imply alterations on the semantic level. In fact, speakers themselves cannot tell if their production corresponds to one type of variation or to another, for these fluctuations are seen as admissible. If a listener can perceive a variant as different from the rest of the categories in the same variability space, we can speak of functional variation, which is considered prominent since it differs from the admissible fluctuations. What is certain is that recognition of a distinctive function allows identification of the different spaces of variability.

For his part, Harrington (2012) establishes six types of synchronic variation which he relates to change and to diachronic variation, five of which are considered linguistic variation. Among them, he distinguishes

⁹ In this paper, when using the term "discrimination" we are referring to perceptual distinctiveness.

¹⁰ See also Flemming (2004) for a similar idea from the perspective of perceptual phonetics.

variation caused by physiological constraints, by plasticity, by the non-linear relation between the articulatory production of speech and the acoustics of sound, by the communicative conditions (new vs. old information) and the level of variability naturally tolerated in speech. All of these may coexist in the *yeísmo* process. Nevertheless, the important issue is that, according to the author, this synchronic variation may have a parallel in historical tendencies, so that the study and explanation of current variation may provide an opportunity to understand sound changes which are phonetically induced. Indeed, his variation typology can be recognized in the explanations of sound change by other researchers, like Blevins (2004) or Caravedo (2014), who openly acknowledge that there are different reasons why variation (and subsequently, sound change) may arise.

What seems clear from all these proposals is that the first step leading to sound change is variation (see Ohala 1993; Bybee 1998, 2001 or García Santos 2001, for instance) but the main question here is how it operates. It is clear from the preceding lines that variability in speech is generally accepted in the literature, not only at inter-speaker but also at intra-speaker level. Communication, and particularly language acquisition, takes place in an extraordinary context of phonetic variation in which individuals must sample their production options from a pool of possible variants (see Coseriu 1978; Blevins 2004). This situation may give rise to a number of confusions and ambiguities. Some of these mismatches (most of them, according to Ohala 1993) do not lead to modifications in the system because listeners tend to normalize the input by means of their own experience as speakers. However, sometimes, this ability is not enough or it does not operate in a way that makes the misperception become a sound change (Ohala 1981, 2013). Lindblom et al. (1995) take Ohala's proposal into account in their own theory: change arises from the *continuum* of hypo- and hyperarticulation, when subjects, instead of being interested in *what* is being said, focus on *how* it is said, a situation in which they can sample new forms. Thus, both perception and production are seen as closely related and even interacting in sound change.

Hence, variation accounts for the paths evolution may follow. Blevins (2004) arrives at a synthesis of Ohala and Lindblom's models on the basis of the existence of variation as a necessary previous stage for sound change. Blevins (2004: 32) proposes three sources of phonetic change: it can occur in situations of sound misperception, problems in the segmentation of the phonetic chain (misparsing), and problems with multiple choice in the stimulus to which the listener is exposed when acquiring L1 (typical situation of variation). The first source, which she calls *change*, means that the listener replaces the sound uttered by the one understood;¹¹ this means a change in pronunciation but it does not lead to

¹¹ The author illustrates this with a speaker saying [anpa] and the listener hearing [ampa]: the phonetic signal is simply misheard due to similarities between the utterances.

reanalysis. In the second one – *chance* –, the stimulus is phonologically ambiguous, so the listener will associate it with a phonological form which does not coincide with the speaker's.¹² Chance does imply reanalysis and reinterpretation of the sequence and, thus, it can bring about phonological recategorization. The third source – *choice* –, supposes variation at intraspeaker level: the listener selects an option as a phonological form from all the variants uttered by the speaker.¹³ This means that the element preferred will not necessarily be the same phonological form selected by the speaker. These three sources can provide an explanation of how sound change occurs and how it may produce important alterations in phonological systems.

The behaviour of the possible variants in the *yeísmo* merger case may be explained in terms of the variation stated by Harrington (2012) and Caravedo (2014) and by Blevins' (2004) theory. In fact, only by understanding how variation operates in this particular case will it be possible to appreciate the whole change process.

3. Phonetic variation in /ʎ/

In order to give an account of phonetic variation for the lateral phoneme, we are going to use two complementary resources. As a starting point, we have taken an acoustic experiment carried out by Rost Bagudanch (2011). The goal of this test was to determine which allophones were attested in the speech of individual speakers (§2.1). To complement these results, we have collected dialectal data from linguistic atlases to establish the possible realizations in different areas of the Spanish linguistic domain (§2.2).

3.1 Intraspeaker variation

3.1.1 Methodology

In the aforementioned experiment, three male speakers aged between 40 and 50 years old were recorded while reading a series of paragraphs including words containing /ʎ/.¹⁴ All the subjects were non-distinguishers: they could not discriminate /ʎ/ from /j/, either in production or in

¹² It would be the case of a speaker producing [ʎaʔ] for /aʔ/ and the listener interpreting /ʎa/.

¹³ Blevins (2004: 33) offers the example of a speaker uttering [kakáta], [kākáta] and [kkáta] for /kakata/ and a listener assuming /kkata/.

¹⁴ The whole experiment was intended to compare the lateral consonants /l/ and /ʎ/ in three different contexts -/lV/, /l̞V/ and /ʎV/- in order to establish a *continuum* from the least palatal solutions to the most palatal ones. It was hoped that our study would also throw light on the evolution of the Lj sequence in Latin to /x/ in current Spanish. The diachronic change shows great parallelism with the *yeísmo* phenomenon, so we exploited the experimental approach to explain the historical change.

perception¹⁵. Indeed, it is very difficult to find native Spanish speakers who can discriminate the lateral from the approximant. The subjects were born and raised in three different areas of the Iberian Peninsula¹⁶ (Leon, Alicante and Aragon), but they have spent many years in Catalonia. All of them had university degrees and exhibit a medium to high socio-cultural level. None of them reported any kind of speech production problems.

The recordings were carried out in a completely quiet and echo-free room in the Phonetics Laboratory of the Universitat de Girona (Girona, Spain). A Shure Unidyne 5155D directional microphone and a Marantz PMD 670 professional recorder were employed. The subjects were asked to read a series of paragraphs in a spontaneous way and at a natural pace, as if they were talking to someone else. In fact, the content of the sentences favoured an informal register. They were allowed to read them once before the recordings started.

Two factors were taken into account: (i) point of articulation of the syllabic vowel and (ii) stress. These independent variables were expected to modify the behaviour of the consonant to some extent: on the one hand, the presence of /ʎ/ in a stressed position may result in the appearance of tenser variants.¹⁷ A stressed syllable can be considered a prominent context while unstressed syllables are supposed to favour more relaxed variants, since this position means an easing in articulation gestures (Recasens 1999). On the other hand, palatal vowels are thought to pave the way for the elision of /ʎ/, at least from a dialectal standpoint,¹⁸ but central and velar vowels do not seem to do so. Prosodic variation was not taken into account as a variable, since a pilot study showed no significant influence on the production of the consonant.¹⁹ Some examples of paragraphs in the corpus are shown in (1), where the words containing /ʎ/ are in italics. There were 30 instances for each of the levels of these variables, which mean that every speaker produced 180 instances of the lateral phoneme and that the total number of utterances analysed is 540, as can be seen in greater detail in Table 1.

¹⁵ Although these particular speakers were not able to differentiate [ʎ] and [j] at any level (production and perception), this does not necessarily mean that the sound change has been completed everywhere. In fact, a perception experiment carried out with subjects from the northern areas of Spain demonstrated that, even when they were non-distinguishers in production, they were still able to discriminate in perception (Rost Bagudanch 2016).

¹⁶ For the purpose of the research, it was important to demonstrate whether the dialectal origin of the speakers made a difference in their behaviour. This justifies the selection of participants from different geolectal areas.

¹⁷ We consider tense variants the ones produced with a clear articulatory constriction (a complete or almost complete obstruction of the airflow), especially fricatives, affricates and stops.

¹⁸ See explanations of elision in Quilis (1999), Quesada Pacheco (2010b), RAE (2011).

¹⁹ This is consistent with Bauer (2008: 619), who states that position is not a factor that necessarily conditions lenition processes.

- (1)
 - a. A pesar de ser el *empollón* del grupo, se relacionaba muy bien con todos; de hecho, un fin de semana se fue a la feria del *mejillón* con varios compañeros del instituto, *gallegos* como él, con los que había montado algún que otro *follón* en el *pabellón* de su pueblo. [Although he was the swot of the group, he had a great relationship with all of them; in fact, one weekend he went to the mussel fair with some high school classmates, all of them Galician like him, with whom he had started some trouble in his town's sports hall.]
 - b. El jamón de Jabugo se obtiene de los cerdos de pata negra alimentados con *bellotas*, normalmente en las famosas dehesas de la zona, unos lugares *llenos de belleza* que hay que haber visto al menos una vez en la vida. [Jabugo ham is obtained from black-legged pigs fed with acorns in the famous meadows of the Jabugo area, beautiful spots one should visit at least once in a lifetime.]

The acoustic analysis was performed with Praat (v. 5.1.15) (Boersma and Weenink 2009), using waveforms and spectrograms. We classified the segments obtained according to their spectral properties and we also measured the duration and the frequency of the first three formants. According to Ladefoged and Maddieson (1996: 98) or Quilis (1999: 116), the most relaxed allophones should display a shorter duration than the tenser ones, and even the formant frequency may help in distinguishing different acoustic realizations.

Data were processed using SPSS software (v. 15). Anovas, t-tests and Mann-Whitney U tests (the latter in case of non-normal distribution) were employed to determine whether the different allophones obtained presented analogous acoustic features or not and whether their nature fluctuated depending on the factors taken into account, namely stress and point of articulation of the syllabic vowel. The significance level (*p*) was set at 0.05.

We also used a contingency table when it was necessary to relate qualitative variables (i.e. type of allophone and context of appearance). In this case, Pearson's X^2 test was conducted in order to determine whether the variables were statistically related: if the probability value was under 0.05, we considered there was a significant relationship between the variables. In this case, we also looked at the adjusted standardized residuals to know which variants had relevant behaviour: if this value is higher than 1.96 or lower than -1.96, there is a significant relationship between the variants (there are more cases than the statistical model predicts or there are fewer cases than expected).

As one can deduce from the preceding explanation, in these analyses the dependent variables were duration and formant frequency, as well as the kind of allophone, while stress and point of articulation of the following vowel were considered factors that could modify the acoustic features of the sounds and, as a consequence, could alter the category of the allophones.

		Informant 1	Informant 2	Informant 3
palatal vowel	stressed syll.	30 cases	30 cases	30 cases
	unstressed syll.	30 cases	30 cases	30 cases
central vowel	stressed syll.	30 cases	30 cases	30 cases
	unstressed syll.	30 cases	30 cases	30 cases
velar vowel	stressed syll.	30 cases	30 cases	30 cases
	unstressed syll.	30 cases	30 cases	30 cases
TOTAL INSTANCES PER INFORMANT:		180 instances	180 instances	180 instances
TOTAL INSTANCES:		540 instances		

Table 1. Number of instances analysed for each variable taken into account.

3.1.2 Results

The acoustic analysis allows us to recognize five allophones for the palatal phoneme (see Figure 2a) according to their spectral proprieties (i.e. presence of formantic structure, noise, or a closure phase followed by a release burst). Interestingly, there is only one periodic variant: the approximant one ([j]), which is also the most frequent choice (78.05%). In addition, there are three non-formantic solutions, all of them voiced: a prepalatal fricative [ʝ] (8.47%), a palatal affricate [dʒ] (5.84%) and a double articulated palatal stop [tʃ] (4.08%). There are also instances of elision, but this variant is even rarer (3.56%) than the cases of palatal stops. These phonetic realizations are common to all the speakers recorded, though in different percentages, as can be seen in Figure 2b. The most recurrent allophone is the approximant (78% on average) although it is worth pointing out that in Subject 3 the non-periodic solutions seem to be more frequent when compared with the other informants: 40% vs. 9% in Subject 1 and vs. 17% in Subject 2. The most remarkable result is that there is no phonetic palatal lateral solution since perception does not allow us to mix [j] solutions with [ʎ] ones, as will be explained further in §3.

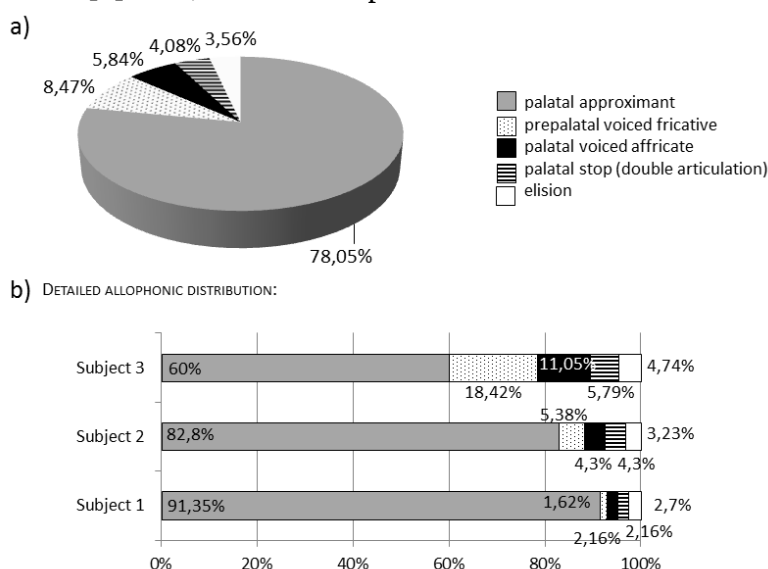


Figure 2. Graphs showing the general allophonic distribution (a) and the distribution for each one of the three informants (b).

It is important to offer a brief description of the acoustic features of these variants in order to distinguish them. The first one, [j], is the only one that presents formantic structure. As can be observed in the spectrogram included in Figure 3, the transitions to the adjacent sounds are smooth and long (26.35ms on average). Its first formant is usually located at about 345Hz, while the second one is typically near or above 2000Hz, as is characteristic in a palatal sound. Its intensity is less than that of the neighbouring segments and it frequently seems to vanish in F2. The total duration of the consonant is around 73ms, though it can be longer.

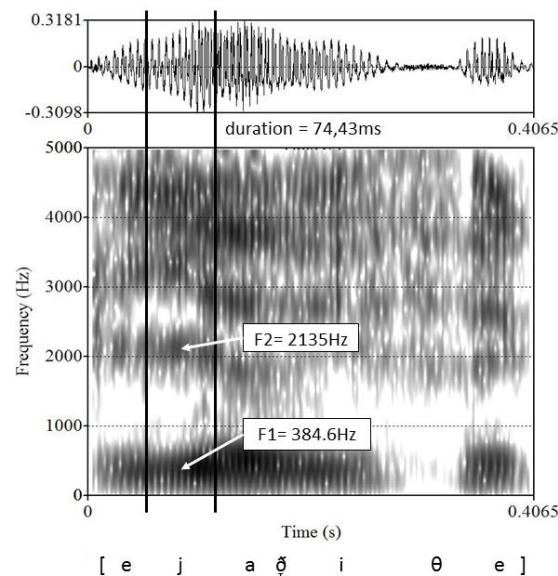


Figure 3. Oscillogram and spectrogram of *ella dice* ('she says'), in which the palatal consonant is produced as a palatal approximant.

The fricative variant [ʒ] is also a long sound (approximately 78ms) and also displays long transitions to the following segment (23.68ms on average) but it has no formantic structure: acoustically, as this kind of sound is produced by a turbulent airflow caused by the narrowing of the air path at some point in the vocal tract, we can see chaotic energy (noise) concentrated in high-medium frequencies. Figure 4 is a good example of this.

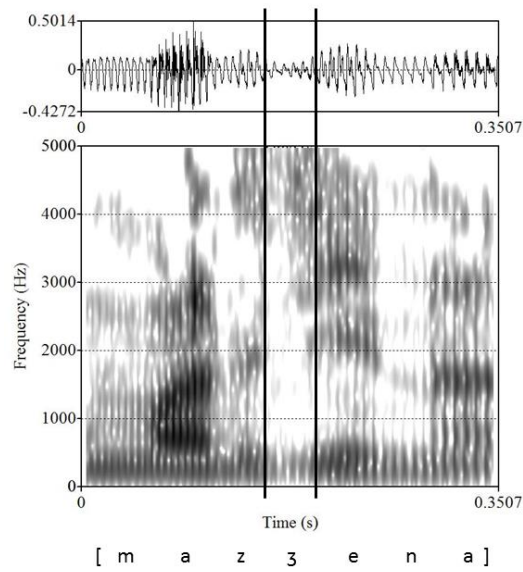


Figure 4. Oscillogram and spectrogram of *más lleno* ('fuller'), in which /ʎ/ is produced as a voiced prepalatal fricative.

The third possibility is a voiced palatal affricate [ɟʝ]. Affricates can be considered a combination of a plosive and a fricative sound. As can be observed in Figure 5, there is a closure phase, which is acoustically a silence in the spectrogram, followed by a friction phase. These allophones are longer than fricatives or approximants (over 92ms long on average) and their transitions to the following sound are a little longer too (around 26ms on average).

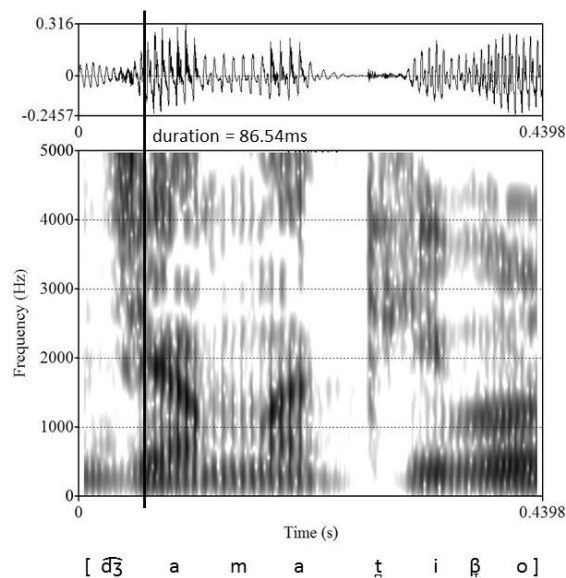


Figure 5. Oscillogram and spectrogram of the adjective (*más*) *llamativo(s)* ('striking'), where the palatal consonant is produced as a voiced palatal affricate.

In some cases, the variant is a plosive sound but it does not show the features of a typical stop as it lacks the burst after the closure phase. Instead of this characteristic release, we find a brief phase which shows the features of an approximant sound, which is a formantic period (see Figure 6). This is the reason why some scholars have called this allophone a double articulated stop.²⁰ Its duration is the longest of all variants (approximately 97ms on average).

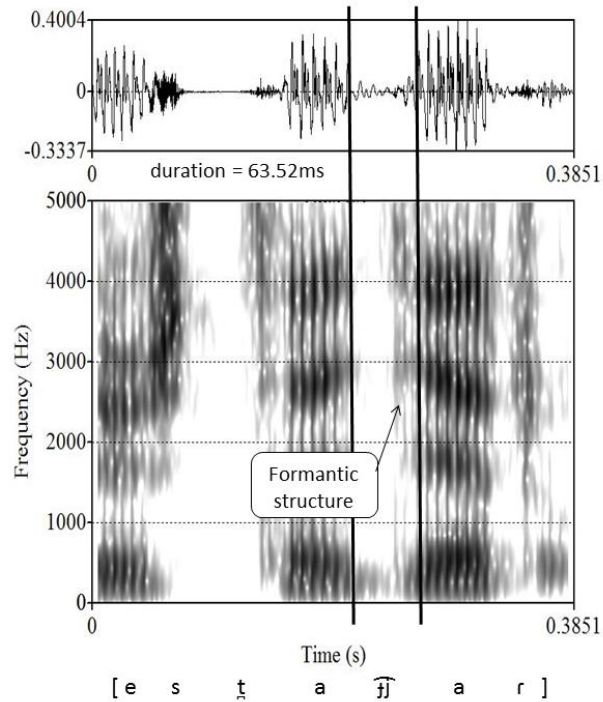


Figure 6. Oscillogram and spectrogram of the verb *estallar* ('to explode'), where /k/ is produced as a double articulated palatal stop.

In addition, there are a few instances in which the consonant has been elided, as in the example in Figure 7.

²⁰ See Martínez Celdrán and Fernández Planas (2007: 58).

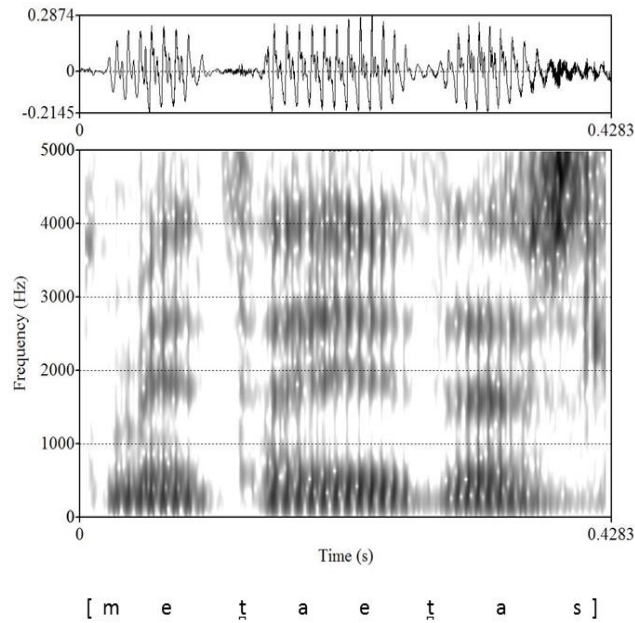


Figure 7. Oscillogram and spectrogram of the noun *met(r)alleta* ('submachine gun'), where there is an elision of the palatal consonant.

Another notable aspect gathered from the results is that the diverse solutions seem to be organized along a *continuum* from tense to relaxed allophones: the tensest variants are usual in onset position or after a nasal consonant whereas the most relaxed options²¹, in particular elision, are regularly found in intervocalic position, though it is not a systematic distribution. However, a more accurate analysis provides further information (see the data in Table 2 and Figure 8).

²¹ Actually, elision and approximant realizations involve less articulatory effort whereas fricatives, affricates and stops are more tense sounds (see Ladefoged and Maddieson 1996: 90, 95-99 for plosives, 137 for fricatives and 322-323 for approximants; see also Dogil 2007: 90).

		[j]	[ɜ]	[dʒ]	[ʃ]	elision
v_v	[pal_pal]	56	8	3	1	8
	[cen_pal]	42	3	3	3	2
	[vel_pal]	24	1	2	1	---
	[pal_cen]	73	5	2	---	4
	[cen_cen]	44	2	1	3	1
	[vel_cen]	13	2	---	---	---
	[pal_vel]	112	8	7	1	5
	[cen_vel]	17	---	2	2	---
	[vel_vel]	39	3	3	2	---
	total v_v utterances	420	32	23	13	20
c_v	[+cont]_pal	2	3	1	---	---
	[+cont]_cen	4	7	1	---	---
	[+cont]_vel	---	1	1	1	---
	[-cont]_pal	6	3	2	---	---
	[-cont]_cen	2	2	2	6	---
	[-cont]_vel	---	---	---	---	---
	total c_v utterances	14	16	7	7	---
#_v	[#_pal]	2	---	2	2	---
	[#_cen]	1	---	1	1	---
	[#_vel]	---	---	---	---	---
	total #_v utterances	3	---	3	3	---
	TOTAL UTTERANCES	437	48	33	23	20

Table 2. Distributional results (number of utterances) of the different allophones in the three possible contexts studied: intervocalic, postconsonantal or postpausal.

Firstly, regarding elision, it is evident from the numbers that it only occurs in intervocalic contexts (100% of the utterances), but it is more likely to come about if one of the vocalic segments is a palatal one: 40% of the intervocalic cases arise when both vowels are palatal (and 45% if there is only one palatal vowel). The adjusted standardized residuals show that this behaviour is significant.²² Nevertheless, there is an intervocalic context where elision does not happen: when there is a velar vowel. We can tentatively suggest that a velar context has an inhibiting effect on the palatal feature of the consonant, which could not be omitted to compensate for this effect.²³ On the other hand, elision never occurs after a pause or a consonant, which means that it does not appear in a prominent position.

²² 2 for a preceding palatal vowel and 2.4 for a following palatal vowel, respectively.

²³ It is difficult for velar and palatal places of articulation to overlap since the gestures involved require larger movements from the front part of the oral tract to the back: it is complicated to achieve a reduction process in which the palatal feature can be easily maintained if the velar one predominates.

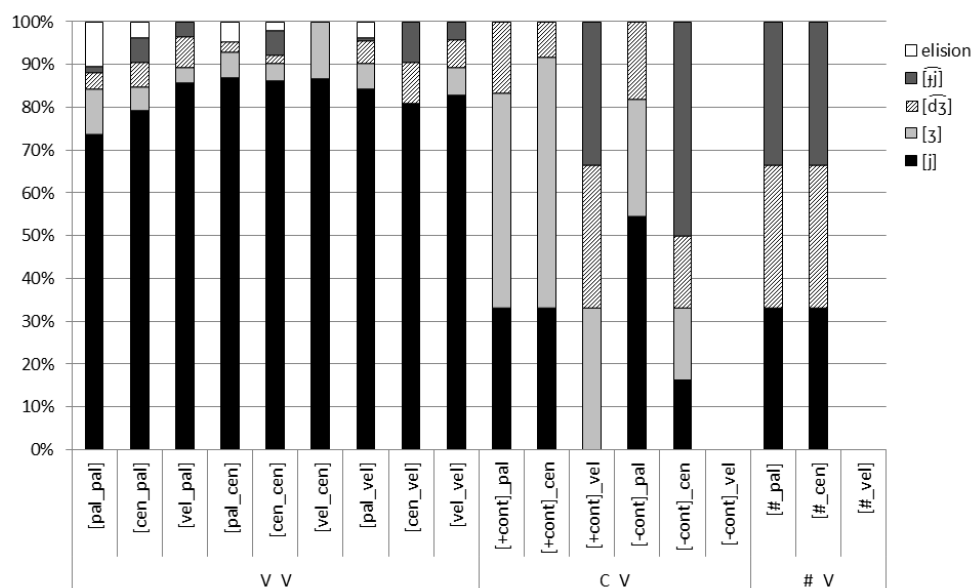


Figure 8. Graphs showing the distribution of the different allophones depending on the context.

Secondly, as we can see in Figure 8, there are statistically relevant differences between [j] and the rest of the allophones since it dominates in intervocalic contexts (96.1% of the total number of cases). Moreover, 73.09% of the intervocalic utterances happen to be in contact with a palatal vowel, which represents 70.25% of the global average, while the utterances after a pause or a consonant are much less frequent (0.68% and 3.20% respectively).²⁴ Therefore, there is a clear parallelism between these relaxed allophones.

After a consonant or a pause, as we have seen, the approximant loses ground and fricative, affricate and stop realizations are the most common sounds. The range of occurrence of [ʒ] is much higher after a [+continuant] consonant, namely [s]; in fact, it is the most common solution in this context (68.75%), while approximants and elision are rare.²⁵ Cases of [dʒ] and [ɟ] after consonant are 21.21% and 30.43%, respectively; in this sense, this behaviour is statistically significant, since the adjusted standardized residuals show that they tend to appear after [-continuant] consonants.²⁶ In post-pausal position approximants account for a third of the occurrences, and two-thirds of the total correspond to the reinforced variants, [dʒ]²⁷ and [ɟ].

²⁴ Adjusted standardized residuals show that the approximant is significantly less frequent after pause (-2.2) and after consonant ([+continuant], -3.6; [-continuant], -3.1).

²⁵ Adjusted standardized residuals for this context are 6.1, thus indicating that [ʒ] is significantly more frequent after a [+continuant] consonant than expected.

²⁶ 2.2 value for the affricate and 3.9 for the plosive.

²⁷ According to the adjusted standardized residuals, it is significantly frequent in postpausal position (4.3).

To sum up, there is a statistically significant relationship between the selection of allophone and the preceding and following segments, as the results of Pearson's X^2 indicate: ($X^2=16.322$, $p<0.038$) and ($X^2=92.358$, $p<0.0001$), respectively.

As a consequence, one may have the feeling that there is a *continuum*, although, taking the absolute frequencies in Table 2 into consideration, one may get the impression that all the allophones obtained tend to be concentrated in the intervocalic context. From that point of view, it seems interesting to check whether there was any influence of position within the word. Table 3 shows the results in absolute and relative frequencies. Plosive sounds appear more frequently in onset position, whereas elision, approximants and fricatives are found in medial position. Conversely, affricates tend to be evenly distributed.

	[j]	[ʒ]	[dʒ]	[ʃ]	elision
onset position	88 20.13%	19 39.58%	15 45.45%	15 65.21%	3 15%
medial position	349 79.86%	29 60.41%	18 54.54%	8 34.78%	17 85%

Table 3. Distribution of the allophones of /ʃ/ in the word domain in absolute and relative frequencies. We have shaded the predominant results.

Neither stress nor the kind of syllabic vowel have an effect on the nature of the consonant. The appearance of one variant or another is more likely to be subject to speech style. We could not compare formant frequency within the variants since there was only one which presented this kind of acoustic structure. As for duration, affricates and stops tend to be longer (see Table 4 and Figure 9), which is consistent with their appearance in onset position where sounds tend to be tenser, for a longer duration could be considered a reinforcement cue. However, statistics reveal that while there are no significant differences between the duration of [j] and [ʒ], in fact they are between the approximant and the affricate ($U=3717.5$, $Z=-3.331$, $p<0.001$) and between the approximant and the plosive ($U=3433.0$, $Z=-2.151$, $p<0.031$). In the same way, there are also significant differences in duration between the fricative and the affricate ($t=-2.258$, $p<0.027$). The affricate thus shows a significantly longer duration than the approximant and fricative variants, while it cannot be distinguished from the plosive by means of duration, as can be seen in Figure 9. This marks a difference between reinforced sounds and more relaxed ones.

	[j]	[ʒ]	[dʒ]	[ʃ]
$\bar{x}$	74.44ms	76.54ms	88.66ms	88.21ms
sd	22.81	21.30	24.90	31.23

Table 4. Mean values and standard deviation of the duration of the different allophones (in milliseconds).

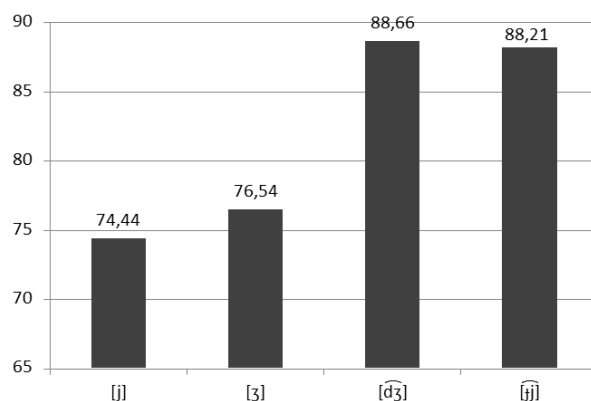


Figure 9. Graph showing the differences in duration of the different allophones analysed. The Y-axis indicates duration in milliseconds.

These results suggest that there is significant variation at intraspeaker level and that it is not limited to a particular speaker: all of them showed the same type of allophones in spite of displaying different rates of occurrence.²⁸ Moreover, this variation occurs in a complementary distribution: plosives tend to dominate in onset position, fricatives are more likely to occur after a [+continuant] consonant, approximants and elision are extremely frequent in intervocalic contexts, particularly when in contact with a palatal vowel. Nevertheless, there is a certain degree of instability in the case of the affricate allophones. What seems clear is that, despite the fact that some scholars consider /ʎ/ a monolithic category,²⁹ the results from Figures 2, 8 and Table 2 point to the existence of variation. According to Blevins (2004), a system can be modified only if different options exist; in other words, the existence of allophonic variation can be seen as the precondition for sound change to take place.

3.2 Dialectal variation

Having examined variation at the speaker level, there is still one question left: what happens at community level or at regional level? The answer is found in linguistic atlases. The sources that we have employed are the Spanish regional atlases (see Table 5 for the complete inventory), since they are the most detailed sources of phonetic information, providing a more accurate phonetic transcription than most dialectology manuals; even though their use may involve some methodological complications,³⁰ they

²⁸ ($t=92.547$, $p<0.0001$).

²⁹ Allophonic variation in the case of /ʎ/ is usually considered from a dialectal perspective when explaining *yeísmo* (see Quilis 1999: 314-324 or Hualde 2005: 179-180).

³⁰ The use of data from linguistic atlases in Spanish poses some problems. First of all, they were not compiled in the same period: the first one was started in 1952 (Alvar 1961-1973), whereas the most recent ones were published in the last 20 years (Alvar 2001a, Alvar 2001b or Quesada Pacheco 2010); see González González (1992) or García Mouton (2006).

are offset by richer information if compared with most dialectology manuals.

ATLAS	REFERENCE	REGION
<i>Atlas Lingüístico y Etnográfico de Cantabria (ALECant)</i>	Alvar (1995)	Cantabria (Spain)
<i>Atlas Lingüístico de Castilla y León</i>	Alvar (1999)	Castile-and-Leon (Spain)
<i>Atlas Lingüístico y Etnográfico de Aragón, Navarra y La Rioja (ALEANR)</i>	Alvar (1979-1983)	Aragon, Navarre and La Rioja (Spain)
<i>Cartografía lingüística de Extremadura</i>	González Salgado (2005-2010)	Extremadura (Spain)
<i>Atlas Lingüístico (y Etnográfico) de Castilla-La Mancha (ALeCMan)</i>	García Mouton and Moreno Fernández (2003)	Castile-La Mancha (Spain)
<i>Atlas Lingüístico y Etnográfico de Andalucía (ALEA)</i>	Alvar (1961-1973)	Andalusia (Spain)
<i>Atlas Lingüístico y Etnográfico de las Islas Canarias (ALEICan)</i>	Alvar (1975-1978)	Canary Islands (Spain)
<i>El español en el Sur de Estados Unidos...</i>	Alvar (2000b)	Southern part of the United States
<i>Atlas Lingüístico de México</i>	Lope Blanch (1990)	Mexico
<i>Atlas Lingüístico de Puerto Rico</i>	Navarro Tomás (1948)	Puerto Rico
<i>El español en la República Dominicana...</i>	Alvar (2000a)	Dominican Republic
<i>Atlas Lingüístico de América Central (ALAC)</i>	Giraldo et al.(2012)	Central America: Belize, El Salvador, Honduras, Panama
<i>Fonética del español en Guatemala...</i>	Utgård (2006)	Guatemala
<i>Atlas Lingüístico de Nicaragua</i>	Rosales Solís (2008)	Nicaragua
<i>Atlas Lingüístico-Etnográfico de Costa Rica (ALECORI)</i>	Quesada Pacheco (2010a)	Costa Rica
<i>El español en Venezuela...</i>	Alvar (2001b)	Venezuela
<i>Atlas Lingüístico-Etnográfico de Colombia (ALEC)</i>	Flórez (1981-1983)	Colombia
<i>El español en Paraguay...</i>	Alvar (2001a)	Paraguay
<i>Atlas lingüístico Diatópico y Diastrático del Uruguay (ADDU)</i>	Thun and Elizaincín (2000)	Uruguay
<i>Atlas Lingüístico-Etnográfico del Sur de Chile (ALESuCh)</i>	Araya (1973)	Southern part of Chile

Table 5. Linguistic atlases used in the collection of the phonetic variants for /ʎ/ in geographical order from Spain to America, from North to South.

The range of variants listed for the palatal phoneme in these sources reveals an extremely complex situation: around 50 different allophones are

for a detailed explanation of the Spanish linguistic atlases and the consequences of the lapse of time between the initiation of work and their publication. In addition, the methodology is not the same in all of them. Nevertheless, their data are important as evidence of possible phonetic solutions in /ʎ/ contexts. The other big difficulty is the lack of a linguistic atlas for important areas of South America, such as Perú, Argentina or Bolivia, and the Caribbean islands (i.e. an atlas for Cuba was presented in November 2013 but it has not been published yet).

documented, most of them with few acoustic or articulatory differences.³¹ In view of the difficulties of showing them in a chart, we decided to conflate them according to their manner of articulation: in all the atlases, there were instances of elision, glide realizations, approximants, fricatives and affricates. Stops were infrequent although it is difficult to state whether some affricate examples should be classified as plosives or not according to their articulatory description. The result is summarized in Figure 10.

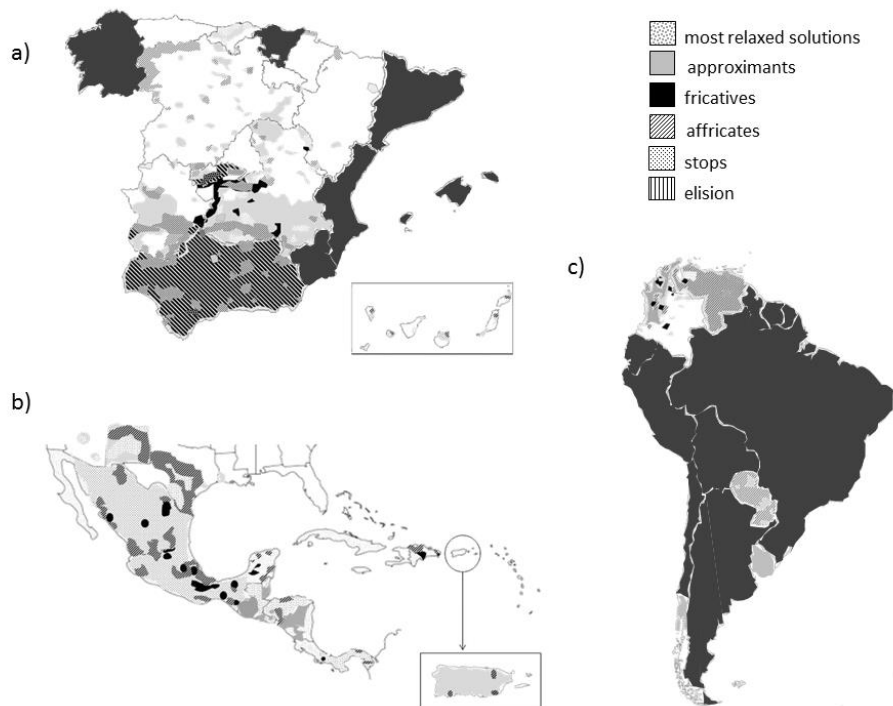


Figure 10. Allophonic variation in Peninsular and Insular Spanish (a), in Central American Spanish (b) and in South American Spanish (c). There is a particular pattern in Andalusia and northern Mexico which involves the coexistence of both approximant and fricative allophones. We have marked in dark grey the areas where there are no available linguistic

³¹ It is interesting to consider some examples of the allophones found in the atlases and the degree of detail in their description. For example, it is possible to see a “prepalatal central muy rehilada” [strongly vibrated central prepalatal] (González Salgado 2005-2010), a “palatal central fricativa con realización adelantada” [advanced central palatal fricative] (García Mouton and Moreno Fernández 2003), or an “alveolo-prepalatal central muy rehilada y sin labialización” [strongly vibrated central alveopalatal with no labialization] (Alvar 1975-1978; Alvar 1961-1973). According to Lope Blanch (1990), there are three different allophones of the palatal approximant: an open solution, a very open one and an extremely open one. Although inferences regarding the acoustic and articulatory properties of these variants from their transcriptions in the atlases can be speculative, it must be appreciated that the authors made every effort to be accurate in their judgements (indeed, they claimed to be trained to distinguish the different phonetic realizations) and, since this is the only “experimental” data we have, we must place some trust in these materials. It should also be pointed out that the most recent studies have included spectrograms and phonetic characterizations (e.g. Alvar 2001a, 2001b).

atlases or where Spanish is not spoken as L1. Data collected from regional linguistic atlases and simplified by the author (see Rost Bagudanch 2014a).

First of all, we find here the same type of allophones detected at speaker level. As a consequence, it appears that these variants are not constrained to a particular area but may be inherent to the Spanish phonetic system. Elisions, for instance, seem to be frequent in intervocalic contexts but, since they tend to appear after a palatal vowel, they will not entail a loss in the palatal information because the listener will be able to make up for it. This behaviour is observed in Central America, where elision is extremely common,³² although it is not unusual in many other areas. Conversely, elision does not appear anywhere in onset position: the segment is more likely to be realized as an approximant in Central America or as an affricate in other parts. The capacity of the sound system to adapt itself to the needs of phonological information is common to all speakers, irrespective of their origin: in a position where the palatal feature could not be supplied by other segments, the consonant will be present but, if this cue could be recovered from other adjacent segments (especially similar vocalic sounds), it would be possible to omit the palatal consonant.

On the other hand, there are some apparent differences in the phonetic distribution of the allophones: approximant realizations (with all the intermediate degrees between glide and approximant, and fricative and approximant) are the most common in Mexico, Central America and most of the Caribbean territories; fricatives are the usual option in South American regions as well as in the southern dialects of Peninsular Spain. Interestingly, according to the atlases, the palatal lateral (which is represented in white in Figure 10) is the most frequent solution in Castile-and-Leon, Aragon, Navarre, La Rioja and the southern area of Cantabria, a state of affairs which differs a lot from other authors' descriptions (even that of the RAE). Nevertheless, the most interesting fact is the possibility of locating almost every kind of allophone in almost every area examined. As we postulated before, this seems to point to inherent tendencies within the Spanish sound system; though, thanks to sociolinguistic factors, some allophones have spread more in some regions than in others (cf. Gómez and Molina Martos 2013).

4. The origin of the sound change

We have now attested the existence of variation in the context where change has started and is still in progress.³³ Such variation appears to be the

³² In Figure 10b elision has not been marked as it should, because one more overlapping pattern would impede proper interpretation of the other possible solutions in this area.

³³ Though a case of stable variation in the sense of Labov (1994) or Caravedo (2014) can be seen, the extent of the *yeísta* change is increasing even in areas where it seemed to be stable: Utgård, in Quesada Pacheco (2010b: 76), explains how the youngest generations in

condition *sine qua non* for the change to occur but there is still one question that remains unanswered: what is the ultimate reason for that change? Why is the palatal lateral replaced by an approximant consonant?

Traditionally, even in diachronic accounts of the evolution of the palatal lateral into a velar fricative, it is stated that an approximant solution involves less articulatory effort. In fact, the alteration of the lateral to an approximant should respond to a hypospeech tendency that would have started when distinctiveness was not endangered.³⁴ However, in other Romance languages, both solutions remain as two distinct phonemes, e.g. in Catalan or Italian, but this is not so in Spanish. Alarcos (1971) argued in favour of a useless phonemic opposition in the Spanish system but there are works (see Ohala 1974 or Blevins 2004) that postulate that sound change is not teleological: speakers do not modify their “norms” in order to keep the functionality of the system, they just interact, their only purpose being to make sure that the listener will perceive their message correctly.

The idea of articulatory effort, which has been mentioned above, must be considered before moving forward because it is a somewhat controversial subject. In Lindblom (1990a) and Lindblom et al. (1995) articulatory effort is associated with the idea of “economy”, in the sense of “the minimal expenditure of energy compatible with the task” (Lindblom et al. 1995: 8): if the speaker considers that the listener will be able to understand the information without making it totally explicit, he will produce hypofoms. Variation, as we have already commented, arises in this kind of situation: these hypofoms are usually seen as instances of lenition processes, which can be considered as “a failure to reach a phonetically specified target: articulatory undershoot or underachievement” (Bauer 2008: 611).³⁵ In any case, the replacement of /ʎ/ by /j/ can be seen as an instance of undershoot since the degree of constriction decreases (cf. note 18).

In this context, then, the explanation of the gradual disappearance of the lateral realization lies in the acoustic properties of both the palatal lateral and the approximant. According to Quilis (1999: 261), the differences

Guatemala prefer the approximant realization to elision, which is declining due to the influence of Mexican Spanish; and Montero Bernal, in Gómez and Molina Martos (2013: 138), shows that the approximant is spreading gradually in the urban areas of Cuba, especially in the centre and the eastern parts of the country. These examples seem to point to progress in the change. Besides, variation, even stable variation, is needed to trigger a sound change, which can arise from stable variation which becomes unstable – see Caravedo (2014).

³⁴ Wedel et al. (2013) demonstrate the “functional load hypothesis”, whereby elements with lower functional load are more likely to undergo merger processes. Within the languages and the phonological contrasts analysed by these authors, the merger between /ʎ/ and /j/ in Spanish was included.

³⁵ Kingston (2008) coincides in part with this statement but includes another interesting element: the acoustics of speech. He indicates that speakers manipulate articulatory gestures (reducing the interruption of the airflow, thus increasing openness) to achieve an acoustic goal (increasing consonant intensity), which allows important phonological information to be communicated to the listener: that the prosodic constituent is continuing.

between these two sounds lie in the lower intensity of F2 in the case of the approximant, which also exhibits a clear positive F2 transition; in addition, all transitions appear to be smoother and longer (cf. Rost Bagudanch 2015). Figure 11 shows the waveform and the spectrogram of the words *callado* [kaʎaðo] ‘quiet’ (11a) and *cayado* [kajaðo] (11b) ‘walking stick’ produced by a Catalan speaker, in whose phonetic system the lateral and the approximant are two unambiguous phonemes. At first glance, the differences in intensity are not obvious: in fact, the second formant of the lateral is only 2 dB stronger, which is not a significant difference (71.71dB in the approximant and 73.26dB in the lateral). The duration of transition is similar in both of them: 45ms for the approximant and 51ms for the lateral (slightly longer in the latter) and their direction is similar. The clearest difference one can detect in this picture may be the frequencies of F2 and F3. If this is so, the frequencies of F2 and F3 could be the necessary cues to distinguish the approximant from the lateral. In fact, Recasens (1996: 317) affirms that the frequencies of F2 and F3 help to differentiate between [ʎ] and [j] since these formants are lower in [ʎ] than in [j].³⁶

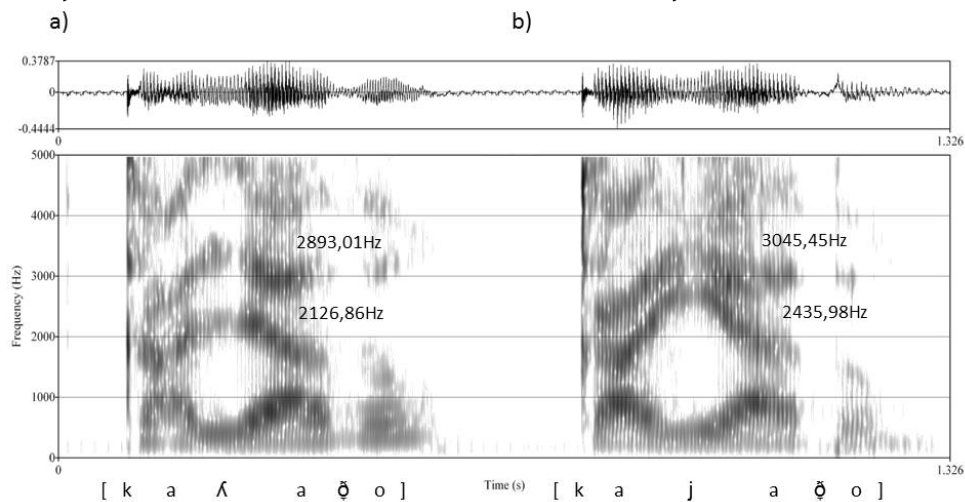


Figure 11. Waveform and spectrogram of the Spanish words *callado* ‘quiet’ (a) and *cayado* ‘walking stick’ (b).

Statistical analyses were performed with data from the aforementioned experiment (§3.1) but there was no relevant difference which could point to sounds with lower F2 and F3 being considered as laterals.³⁷ This result is not totally surprising if we bear in mind that F2 is

³⁶ “L’espectre acústic i les transicions vocàliques de /ʎ/ són similars als corresponents a [j]. Una constricció dorsopalatal menys pronunciada durant la producció de [ʎ] vs [j] fa que F1 esdevingui lleugerament superior, i que F2 i F3 edevinguin lleugerament inferiors” [The acoustic spectrum and vocalic transitions of /ʎ/ are similar to those of [j]. F1 is slightly higher and F2 and F3 slightly lower due to a less pronounced dorsopalatal constriction during the articulation of [ʎ] vs [j]].

³⁷ Information about data, statistical tests and variables is available in Section 3.1.1.

the acoustic cue for the point of articulation and that both the lateral and the approximant are palatal sounds.³⁸

Hence, the general conclusion that stems from these data is that there are no relevant acoustic differences between the lateral and the approximant and, besides, they can be easily confused perceptually. As a result, it is not difficult to misperceive the stimulus, which can certainly lead to a reinterpretation of the signal. The origin of *yeísmo* probably lies on the listener side, more than on that of the speaker (cf. Ohala 1996). In the terms used by Blevins (2004), it would correspond to the *change* source of her sound change typology, whereby the listener replaces the sound uttered by the one understood. However, this source would interact with *selection*, since the confusion between [ʎ] and [j] would take place in a variation context: certainly, variation would entail misperceptions which would give rise to long-term phonological recategorization.

5. Discussion: phonological consequences

At the beginning of this study we were interested in finding out whether there was variation in the context of *yeísmo* and if there were clear acoustic differences between the possible solutions. Our research made it possible to see that there is a great deal of variation at two levels: intra- and inter-speaker. The experiment in Section 3.1 proved that there are different acoustic realizations at intra-speaker level and that they present clearly distinctive acoustic features. The only problem is when one compares a palatal lateral and a palatal approximant, for they have similar acoustic properties, as seen in Section 4. This acoustic similarity may account for the confusion and gradual replacement of the former by the latter. In terms of Kingston's efficiency principle (Kingston 2008), the approximant implies not reaching the articulatory target for [ʎ], but entails an equivalent acoustic output with no cost at informational level due to the low functional load of the opposition between /ʎ/ and /j/. Besides, in Section 3.2 we have observed that variation also existed at the inter-speaker level, which reinforces the idea of inherent phonetic tendencies in the system.

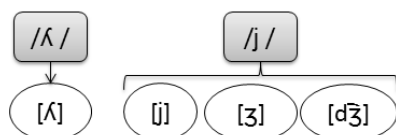
Closely related to this, we wanted to elucidate whether, in fact, this variation and misperception contexts really involves phonological reorganization; in other words, a change in phonological rules. Several scholars have pointed out the importance of the listener in sound change (e.g. Ohala 1996; Flemming 2004). From this point of view, Colantoni (2008) states that microvariation and macrovariation³⁹ may serve to initiate

³⁸ In other acoustic analyses, the main differences were related to F1 and the duration of transitions, but not to the frequency of F2 or F3 (Rost Bagudanch 2015).

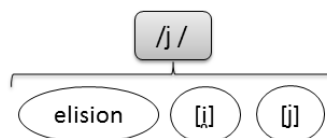
³⁹ According to Colantoni (2008: 70), *microvariation* is non-prominent variation from a perceptual perspective ("aquella variación que no es prominente desde un punto de vista perceptual") while *macrovariation* refers to perceptually prominent variation ("aquella prominente desde un punto de vista perceptual"). She understands perceptual prominence in

the change: in the case of [ʎ] and [j], there is little perceptual difference between them, so they can be easily confused (microvariation). As a consequence, speakers may have chosen a hypoarticulated option as a canonical form, an option that maintains the requirements of communication along with the efficiency principle. For them, [ʎ] and [j] are one and the same. In categorical perception terms, both sounds correspond to the same phoneme and listeners cannot tell one allophone from the other, as they are interpreted as the same category. On the other hand, fricative, affricate and plosive realizations should be considered as macrovariation, since the differences between them are important and they should be distinguished without difficulty. In practice, however, it seems that these realizations may no longer be discriminated and they are confused with an existing category, /ʎ/.⁴⁰ This seems to be the path *yeísmo* has followed in its merger process.

a) RAE (1973):



b) Central America:



c) Argentina:

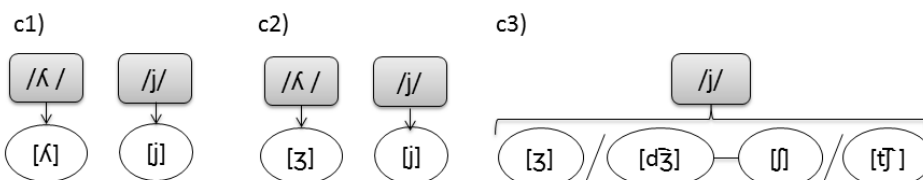


Figure 12. Diagram showing the phonological organization of the palatal phonemes in three different dialectal areas.

Data from Spanish dialect atlases illustrate the phenomenon in a clearer way (see diagrams in Figure 12). Traditionally, it was stated that there were two lateral phonemes in Spanish (the alveolar /l/ and the palatal /ʎ/) and a palatal fricative. This “fricative” phoneme had several allophones: an approximant consonant or fricative and affricate solutions, which were considered dialectal realizations. From this point of view, standard Spanish had two palatal phonemes with two main allophones: the palatal lateral /ʎ/ and the palatal approximant /j/ (see 12a). Nevertheless, it was accepted that,

the same sense as Ohala and Kawasaki (1984: 116), that is, the “scalar property that determines a given event’s detectability”.

⁴⁰ The speakers recorded in the aforementioned experiment (§3.1) are not aware of producing [ɟ], [dʝ] or [tʃ] for a category /ʎ/ or /j/ (in cases of *caballo* [kaβaʎo] ‘horse’ or *mayo* [majɔ] ‘may’). When asked, all of them believed they had pronounced [j] or even [ʎ].

in some regions, the lateral phoneme could also be produced as an approximant sound. Nowadays, the data collected by some researchers suggest that the phonemic system does not exactly match this description (cf. Hualde 2005; García Mouton and Molina Martos 2012; Gómez and Molina Martos 2013). We find an illustration of this in an institutional advertising campaign in summer 2013, which insisted on the importance of keeping beaches clean. The slogan was as follows:

(2)

Antes de recoger la toalla, limpia tu metro de playa
Before of picking the towel, clean your metre of beach
'before you pick your towel up when leaving the beach, clean up after yourself'

Here *toalla* and *playa* are supposed to rhyme, which suggests that [ʎ] and [j] no longer contrast in Peninsular Spanish.

The observations from other regions within the linguistic domain can shed light on what is happening in Peninsular Spanish. Let us see two of them. Central American Spanish is a good example: according to Quesada Pacheco (2010), when describing the phonological system in these countries, it was useless to look for a palatal lateral phoneme, the only phoneme attested being the palatal fricative or approximant phoneme (see 12b). So, in this area there is a lenition process: increasing the intensity it is possible to come to an [j] or even zero stage. Here speakers have chosen, from the pool of variants, the most relaxed ones. It is an efficiency option in the sense of Kingston (2008) or even Bauer (2008). In this microvariation situation, hypoforms have been adopted as canonical.

The second example is Argentina, a huge territory with an interesting situation concerning *yeísmo*. In the northern area, in Misiones and Corrientes, the distinction between the lateral and the approximant is still maintained, as in the conventional descriptions of standard Spanish (see 12c1). In contrast, in Santiago del Estero the system has evolved in a different way: the distinction is still alive but in a different sense. In this system, the palatal lateral has become a voiced prepalatal fricative, which contrasts with the palatal approximant (see 12c2). However, the rest of the country lost this distinction in the 18th century. The main difference between this merger case and the one in Central America is that, in Argentina, the palatal phoneme corresponds to the prepalatal fricative (or affricate) consonant, which tends to be voiceless in younger speakers (see 12c3). To sum up, there are 3 possible coexisting systems, located in several areas within the Argentinian Spanish domain: the “classical distinction”, the distinction between fricative and approximants and *yeísmo* realized as fricative consonants. In the latter, a prepalatal fricative phoneme is occasionally invoked (see Fontanella de Weinberg 2005). In this case, it seems as if, instead of lenition, *yeísmo* has undergone fortition because once

it has reached the [j] stage in the merger process, it undergoes a strengthening; in other words, an increase in articulatory constriction and a decrease in acoustic intensity. The path is that of the hyperforms, as described by Lindblom et al. (1995), probably favoured by linguistic contact with prestigious systems which included fricatives and affricates in their inventories.

The data from linguistic atlases analysed in this paper, along with our experiments, seem to indicate that the most common system in Spanish is one that lacks a palatal lateral phoneme. The resulting palatal phoneme may be produced in multiple ways depending on internal factors and external influences. The results of Section 3.1 suggest that lenited forms are more frequent in internal position (intervocalic position) while the most strengthened ones are more likely to appear in onset position or following a [-continuant] consonant, thus balancing intensity features, as referred to by Kingston (2008). According to the literature, one might also take sociolinguistic factors into account, but we could not demonstrate them in this study: Argentinian Spanish, for instance, has been in close contact with French and Italian, which could partly explain the prominence of [ʃ]/[ʒ] (see Fontanella de Weinberg 1987 for further information on this issue). The distinction between /ʎ/ and /j/, however, has almost disappeared and it only remains in some areas of Argentina, Bolivia and, rarely, in Paraguay. What seems to be general in the *yeísta* zone, according to our modest data, is that the palatal lateral is no longer regarded as a phoneme by speakers, who do not recognize it either in production or in perception.

If we attempt a cautious general exposition of the situation in the whole linguistic domain, there seem to be coexisting grammars (in other words: different phonological systems), and therefore a situation of variation that could lead to sound change. Indeed, according to Moreno Fernández (2005), some of the regions surveyed are concluding the last stage of the phenomenon (see Fontanella de Weinberg 2005).

As seen, diatopic data do not allow us to conclude that [ʎ] exists as an allophone but experimental data actually would. Hence, the experiment referred to in §3.1 not only studied the behaviour of /ʎ/ but also compared it with the sequences /li/ and /IV/. The purpose was to check whether the lateral consonant had the same properties before a vowel and before a palatal glide, in order to determine the existence of a *continuum* from [l] to [ʎ]. The variables and acoustic parameters taken into account were the same as in §3.1. The results in /li/ revealed that, in fact, [ʎ] is a possible realization of the lateral phoneme /l/ when it occurs in a palatalizing context. As can be observed in Figure 13, [ʎ] was one of the allophones co-occurring in such a context along with the alveolar lateral and a palatalized variant.

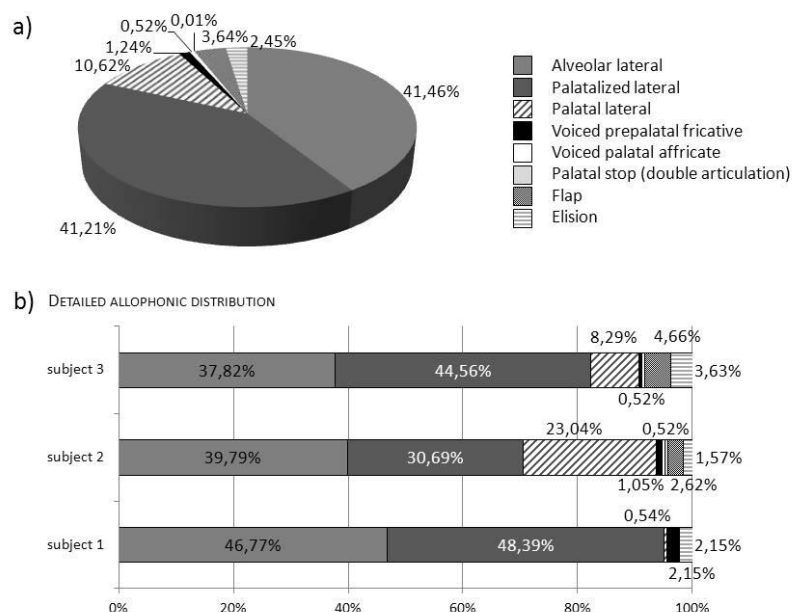


Figure 13. Graphs showing the general allophonic distribution for /li/ sequences (a), and the distribution for each one of the three informants (b).

In our comments we have been referring to the whole process as a merger. An important issue about this notion, however, is its symmetry or asymmetry in terms of production and perception. Labov et al. (1991) argue that, when there is asymmetry, we should talk about near-merger rather than merger. The main characteristics of near-merger also include the existence of “considerable individual variation within the community. Some individuals show a near-merger, others show a complete merger, and others a distinction” (Labov et al. 1991: 45). The speakers in our experiment fit perfectly with the idea of a concluded merger but other experiments show that there are listeners who can distinguish in perception though not in production (see Rost Bagudanch 2016). Dialectal data also indicate the absence of homogeneity in the allophonic variants: as seen in the literature, the progress of *yeísmo* is not uniform across regions and this heterogeneity seems to affect individuals in the same community; moreover, according to apparent-time studies such as Rohena-Madrado (2013), Molina Martos (2006) or García Mouton and Molina Martos (2012), the sound change is actually progressing, even though other research in dialectology points to considerable consistency within dialectal areas (e.g. Rosales Solís in Gómez and Molina Martos 2013). Another typical feature of near-merger is that opposing phonemes must show a small phonetic distance, something that we have already mentioned. It would thus seem that, at least in some areas, we should talk about a near-merger rather than a merger. However, it is important to bear in mind that we have not conducted minimal pair or

commutation tests, which could help us to determine more exactly what the situation is with respect to a near-merger case.

Finally, as mentioned at the beginning of this paper, both dialectal and experimental data allow us to draw a clear parallelism with the diachronic evolution of Latin *Lj*. This sequence, palatalized in Late Latin and, later on, in early Romance, became the approximant consonant. In medieval Spanish voiced fricative and affricate solutions are attested and, in the 16th century, thanks to a general devoicing, these were transformed into their voiceless counterparts. The emergence of the velar fricative may have taken place in the second half of the 16th century (see Canellada 1972; Quilis 2005: 171; Ariza 2012: 227-229).

Taking this chronology into account, it seems plausible to put forward some equivalence with the change currently in progress. Argentinian Spanish, for instance, has attained a stage comparable with 16th century Peninsular Spanish, whereas contemporary Peninsular Spanish is moving towards the solutions of medieval Castilian, which have been supported by data in the linguistic atlases in almost all the regions examined. It is important to note that this evolution seems to be progressing more quickly in the southern dialects than in the northern ones. In any case, it appears that the old phonemic distinction has been kept in rural and isolated spots, contrasting with its disappearance in the rest of the Spanish linguistic domain (notice that sociolinguistic factors are an important condition, since the spread of *yeísmo* is considered a sound change from below in progress (see Moreno Fernández 2005). It would thus appear that /*ʎ*/ is likely to disappear completely. Following the analogy with the diachronic change, the genesis of velar solutions in this context would not be strange, even more so if we consider that there are cases already documented in *ALeCMan* (García Mouton and Moreno Fernández 2003): e.g. [arθixa] for *arcilla* ‘clay’ and [taxo] for *tallo* ‘blade’ are found in Molina de Aragón (Guadalajara) and Villahermosa (Ciudad Real).⁴¹

6. Conclusions

In this paper we have shown that variation in the production of Spanish /*ʎ*/ can be found not only at a dialectal level but also in the allophonic realizations of a single speaker. Thus, it is possible to find the same kind of phonetic realizations in both inter- and intra-speaker domains. This variation displays a *continuum* from the least tense solutions to the tensest ones. It tends to be organised in complementary distribution, the hyperarticulated allophones tending to appear in onset position and the hypoarticulated ones generally being found in intervocalic position.

⁴¹ In González Salgado (2005-2010) we find a case of aspiration in the word *gavillón* [gaβiʎon̥] in Fuente del Maestre (Badajoz), a phonetic realization which can be accounted for easily if we consider it a variant of the velar fricative [x].

Such an amount of variation could favour situations of confusion and misperception which could then lead to sound change. According to our data, there seems to be no clear distinction between [ʎ] and [j], which is the ideal circumstance for the reinterpretation of the acoustic signal in a hypoarticulation situation, where speakers may produce realizations other than the expected canonical form and thus offer the listener different options for a concrete phonological category, the phonetic chain being reinterpreted by the listener, whose phonological analysis may be quite different from that of the speaker. In fact, diachronic evolution in Spanish illustrates a parallel change, when Lj became [j], [ɟ] in Medieval Spanish and, finally, [x]. In some regions, the current stage in Spanish seems to correspond to medieval [ɟ] or 16th century [ʃ] (stage 4 in Moreno Fernández 2005) whereas in others, it seems to remain in the [j] period (stage 2).

We should thus review the phonological description of Spanish and, accordingly, we would argue in favour of a reorganization of the palatal system, at least in Peninsular Spanish. In this case, we could postulate that there is only one palatal phoneme which merged with the ancient palatal lateral consonant during the last century. After a period of co-existing grammars (i.e. phonological systems), phonological recategorization took place. Consequently, the palatal lateral may no longer be considered distinctive but an allophone of the alveolar lateral phoneme in palatalization contexts. Indeed, it is interesting to note that this sound still exists, although speakers are not aware of producing it. As they are no longer able to distinguish it, they identify it as a variant of an alveolar lateral when followed by a palatal glide or consonant.

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