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Clusters and complex segments in Strict CV: Insights from Gascon and Languedocien

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Abstract

This article examines the extent to which complex segments are reanalayzable as two separate segments by examining /ʎ/ in two varieties of Occitan: Gascon and Languedocien. Varieties of Romance frequently realize /ʎ/ with an accompanying glide-like element (e.g. Colantoni, 2004). We therefore posit that this element may be reinterpretable as a separate segment and therefore be subject to processes which impact the phonological structure. The data for both varieties comes from the *OcOr Corpus* : *a Corpus of Occitan Oral Narratives* (Vergez-Couret and Carruthers, 2018) and we analyze our results using Strict CV. For word-final consonant clusters, we demonstrate that Gascon and Languedocien have different structural representations for word-final consonant clusters in that Gascon has a language specific parameter which allows the Final Empty Nucleus to licence the preceding consonant and support the consonant cluster, while Languedocien does not have such a parameter. Further, our phonetic study of /ʎ/ demonstrates that Languedocien's rule of word-final depalatalization (e.g., Oliviéri and Sauzet, 2016) does not fully account for the data. Overall, we argue that Gascon treats /ʎ/ as a single representation, while /ʎ/ in Languedocien can be reanalyzed as two distinct segments, /ʎj/, which are then subject to language specific structural parameters.

Keywords: Occitan, Strict CV, complex segments, consonant clusters, palatal lateral.

1. Introduction

Complex segments such as affricates and prenasalized consonants are considered to be just that: complex. One such assumption regarding complex segments is that they do not always undergo word-final phonological processes that simple segments undergo (e.g., resolution of violations to the sonority hierarchy; see van de Weijer, 1996). In this article, we demonstrate that what appears to be a complex segment in one variety of a language can be analysed as two separate segments in a neighboring variety, and therefore undergo structural processes such as word-final cluster simplification. Specifically, we examine two varieties of Occitan spoken near Toulouse in the South of France: Gascon in southwestern France and Languedocien,[1] spoken to the northeast of Gascon.

These varieties of Occitan present a test case for such a comparison in that both varieties maintain the palatal lateral where the phoneme arose via regular sound changes from Latin (e.g., Müller, 2011). However, /ʎ/ undergoes two different processes word-finally depending on the variety: /ʎ/ → [j] in Gascon (Mooney & Hawkey, 2019; cf. /ʎ/ → [ʎ]: Oliviéri and Sauzet, 2016) and /ʎ/ → [l] in Languedocien (Bec, 1973; Oliviéri and Sauzet, 2016; Mooney, 2022). We are particularly interested in the palatal lateral, given that multiple studies have noted the presence of a glide-like element which often follows the lateral (e.g. Colantoni, 2004; Recasens, 2014; Mooney and Hawkey, 2019). We posit that the accompanying glide-like element has the potential to be reinterpreted as a second segment, therefore becoming susceptible to processes which affect word-final consonant clusters.

The outline of this article is as follows: we will discuss the background literature relevant to understanding the sociolinguistic situation of Gascon and Languedocien, the target phonological phenomena, our reasoning for using Strict CV as our framework for analysis and describe the corpus from which we collected our data (section 2). We will next address the treatment of word-final consonant clusters by Gascon and Languedocien by describing our methodology, presenting the distribution of results, and our phonological analysis for both varieties (section 3). We will then apply in section 4 our analysis of word-final consonant clusters to test whether variation of /ʎ/ word-finally between varieties may be attributed to differences in underlying representation (section 4). Like our section on word-final consonant clusters, we will first describe the methodology, and then present the distribution of results and our phonological analysis by variety. In the final section, we ultimately conclude by arguing that the traditional palatal lateral phoneme in Languedocien can be reanalysed as /ʎj/, while it remains a single segment in Gascon.

2. Background literature

We begin this section by detailing the relevant literature as it pertains to the two Occitan varieties selected for this study: Gascon and Languedocien. We will situate these two varieties and their treatment of word-final consonant clusters and complex segments in reference to other varieties of Occitan (section 2.1). Next, we provide relevant details regarding our selected theoretical framework, Strict CV, and elaborate

[1] Languedocien is also referred to as Lengadocien, Languedoc, and Lengadoc in various points in the existing literature.

on previous analyses which have treated word-final consonant clusters and complex segments using this framework (section 2.2). We conclude this section by summarizing key-components of the literature and highlighting the corpus that we have selected to use for this study (section 2.3).

2.1. Occitan varieties: Gascon and Languedocien

Varieties of Occitan distinguish themselves from French and other regional minority languages of France, such as Picard, Gallo, and Wallon, in that the Occitan varieties were of the Gallo-Romance *langue d'oc* in the South while the other languages mentioned were part of the *langue d'oïl* in the North (e.g., Lodge, 2004). There are six major varieties of Occitan: Gascon, Languedocien, Limousin, Auvergnat, Vivaro-Alpin, and Provençal (Bec, 1963; Bec, 1973; Oliviéri and Sauzet, 2016; Mooney, 2022). The reference variety of Occitan is based on a conservative variety of Languedocien and serves as a general basis for descriptions of Occitan, although each variety ultimately has its own idiosyncrasies and certain varieties pattern together more than other varieties. To this end, Bec (1963; 1973) distinguishes two main Occitan dialect regions: *aquitano-pyrénéen* and *alverno-méditerranéen.* Although both Languedocien and Gascon are categorized within this framework as part of the *aquitano-pyrénéen* variety, Bec (1963) indicates that Gascon can stand alone as its own variety to some degree.

Further, Languedocien is often divided in the scholarship into western and eastern varieties: Western Languedocien patterns more similarly to *aquitano-pyrénéen* varieties and Eastern Languedocien shares some qualities with dialects of that type and other qualities with *alverno-méditerranéen* varieties (Bec, 1963; Bec, 1973; Oliviéri and Sauzet, 2016). Given that both speakers in our dataset (see Section 2.3) who speak the Languedocien variety of Occitan are from the western portion of the Languedocien region, we do not consider features of Eastern Languedocien when describing the relevant phonological features for this study. Henceforth, we use Languedocien to refer exclusively to Western Languedocien as opposed to Eastern Languedocien. In the following subsections, we first describe the treatment of word-final consonant clusters in Gascon and Languedocien as well as highlight the relevant phonological analyses which accompany them. Subsequently, we discuss the status of the palatal lateral phoneme in both varieties.

2.1.1. Word-final consonant clusters

Assuming a framework based on Government Phonology (e.g. Kaye, 1990), the maximal syllable in standard Occitan, based on Languedocien, has been shown to be a binary branching onset, a binary branching nucleus, and a singleton coda (Sauzet, 2004; Sauzet and Brun-Trigaud, 2012; Oliviéri and Sauzet, 2016). Various restrictions, particularly in word-final position, have been proposed regarding what consonants may fill the coda position and which ones must be treated as extra-syllabic. Glides, liquids, nasals, and /s/ can occupy coda positions regardless of Occitan variety (e.g. Oliviéri and Sauzet, 2016). Turning specifically to Languedocien and Gascon, obstruents and clusters are also permitted in codas word-finally (e.g., *la sèrp* [laˈsɛrp] 'the snake'; Sauzet, 2004; Oliviéri and Sauzet, 2016; Mooney, 2022). The second consonant in the word-final coda position is treated as extra-syllabic (e.g., *sèrp* [(sɛr)<p>] 'snake'; Sauzet, 2004; Oliviéri and Sauzet, 2016). Whereas Languedocien

does not allow for two phonemes to be extra-syllabic, Gascon permits double extra-syllabicity if one phoneme is lexical[2] and one is an inflectional morpheme; CCC_3# is permissible if C_3 is the plural marker /-s/ (e.g., *sèrps* [sɛrps] 'snakes'; cf. Languedocien *sèrps* [sɛrs]; Oliviéri and Sauzet, 2016; Mooney, 2022). According to Oliviéri and Sauzet (2016), at the phrasal level in Languedocien and Gascon extra-syllabic consonants can be deleted (e.g., *sèrp verinosa* [ˌsɛr beɾiˈnuzɔ] 'poisonous snake'), assimilated to the following onset (e.g., *sèt pans* [sɛpˈpas] 'seven loaves of bread'), or become the onset of the following word if it begins with a vowel (e.g., *trauc escur* [ˌtrawkesˈky] 'dark hole').

To summarize, Gascon and Languedocien both permit consonant clusters. Languedocien, on the one hand, allows for one consonant in the coda position and another, either lexical or inflectional, that is extrametrical. Languedocien does not allow for two extrametrical consonants. Gascon, however, allows for a consonant in the coda position as well as an additional two consonants that are extrametrical, as long as one consonant is lexical and the other inflectional. Given that the two varieties treat the pronunciation of consonant clusters differently when considering cases of inflection, we focus this study to deal with word-final consonant clusters which are associated with the base, rather than consider ones which arise because of inflection. In this way, we are able to better limit our analysis of word-final consonant clusters in such a way that suits the needs of our test for the palatal lateral phoneme.

2.1.2. Palatal laterals

Generally, the palatal lateral is considered phonemic in standard Occitan, although some varieties of Occitan such as Provençal are thought to have merged /ʎ/ with the palatal glide, resulting only in /j/ phonemically (Bec, 1973; Mooney, 2022). When discussing the palatal lateral phoneme, it is important to highlight the variability that arises between varieties based on word-position. Word-initially, Gascon retains the palatal lateral phoneme (e.g., *lheit* /ʎɛjt/ 'bed') while Languedocien does not (e.g., *lièit* /ljɛjt/ 'bed'). When in intervocalic position, /ʎ/ is largely maintained across Occitan varieties, including both Languedocien and Gascon (e.g., *familha* /famiʎa/ 'family'), except for Provençal where it has merged with /j/ (e.g., *familha* /famija/ Wheeler, 1988). When it comes to word-final position, on the one hand Languedocien depalatalizes /ʎ/ to [l] (e.g., *filh* /fiʎ/ [fil] 'son'; Bec, 1973; Wheeler, 1988; Oliviéri and Sauzet, 2016; Mooney, 2022). On the other hand, Gascon may retain [ʎ] word-finally (e.g., *filh* /fiʎ/ [fiʎ] 'son'; Oliviéri and Sauzet, 2016) or it may surface as [j] (e.g., *filh* /fiʎ/ [fij] 'son'; Mooney and Hawkey, 2019).

Additionally, word-final /ʎ/ in Gascon permits a following "/s/ in coda position, where /s/ is the inflectional morpheme for the pluralization of common nouns. (Mooney and Hawkey, 2019: 287). However, /ʎ/ does not occur in word-medial coda position in either Gascon or Languedocien (Mooney, 2022). Mooney and Hawkey's (2019) recent study on the loss of the palatal lateral used word-list data from Gascon speakers to demonstrate that [j] is replacing [ʎ] intervocalically and word-finally. They note throughout the study that a glide-like element resembling [j] is routinely found following instances of [ʎ] regardless of word-position. We therefore expect to find such glide-like elements in our data. To our knowledge, a study like Mooney and Hawkey's (2019) has yet to be conducted for Languedocien. We postulate

[2] The authors use 'lexical' to refer to a phoneme which is part of the base, rather than an inflectional morpheme.

that glide-like elements will also occur, given that it is a common phenomenon found in other varieties of Romance (e.g. Colantoni, 2004). We probe the question of whether this glide-like element can be analysed as a segment phonologically is the aim of this study. To analyse this question, we use the framework of Strict CV; we describe the premises of this framework as well as our reasoning for its usage in our study in the following section.

2.2. Strict CV

Strict CV was developed from Government Phonology (GP) as was formulated by Kaye et al. (1990) and Kaye (1990). In GP, all units are maximally binary (except the coda), empty nuclei are both assumed, and systematically applied, and phonological processing is structure preserving, meaning that resyllabification is not permitted. Strict CV grew out of GP via the work of Lowenstamm (1996) where he draws comparisons between templatic languages such as Arabic and non-templatic languages such as Italian to demonstrate how Strict CV allows for a unified underlying structure cross-linguistically. The framework was developed further in various works, notably by Tobias Scheer (e.g., Scheer, 2004). In Strict CV, the syllable is only ever a series of onsets and nuclei such that there is exactly one onset for every nucleus and every nucleus must have an onset.

By using Strict CV, we can better account for phenomena which occur at and across word-boundaries, such as those attested in varieties of Occitan, without needing to assume extrametricality. Additionally, Strict CV allows for variable parametric settings, therefore allowing for variation both within and across languages to be captured within a single phonological theory. In terms of previous analyses of simplification processes which effect complex segments, analyses of phenomena such as Spanish *yeismo* (Lipski, 1989) and affricates in Basque (van de Weijer, 1996) have tended to use Feature Geometry (e.g., Clements, 1985). Although we depart from older analyses of complex segments by using Strict CV, our analysis is not the first to use this framework to capture phenomena which impact complex segments. For example, Faust, Lampitelli, and Ulfsbjorninn (2018) use Strict CV to unify the various forms of the Italian definite article under a single template, arguing that [ʎ] is not primitive in Italian, but results from the conjoining of /i/ and /l/ in a specific configuration. Although we do not go as far as to propose that [ʎ] is not primitive in either variety, we similarly propose that a modification to the representation of /ʎ/ allows for a more unified analysis of a language's phonology and directly consider Faust and colleagues' account in our analysis (Section 4.3.2).

To give an overview of the framework, Strict CV preserves the Empty Category Principle (ECP) which was developed as part of GP and states: "An empty Nucleus may remain unexpressed iff it is properly governed or word final." (Scheer, 2004: 8. Adapted from Kaye, 1990). An empty nucleus which is word-final is often referred to simply as the Final Empty Nucleus (FEN). Languages which permit consonants word-finally (such as English) are said to p-licence FEN, which is a type of prosodic licensing that occurs at the right-edge of a word and thus supports FEN. In languages which allow complex codas, such as English in words like *park* and *tent*, FEN can be a lateral actor which licences the preceding consonant, thus allowing it to become a governor of a preceding empty nucleus (Scheer and Cyran, 2018: 285-286).

Languages which do not have this parameter setting of FEN cannot produce consonant clusters, except if the following nucleus is filled.

2.3. Summary and corpus

This study aims to test whether the accompanying glide-like element that is often present in Romance varieties following /ʎ/ has the potential to be reinterpreted as a second segment, therefore becoming susceptible to processes which affect word-final consonant clusters. To test our question, we will first analyze instances of word-final consonant clusters in both Gascon and Languedocien, which we will then use to apply to both the traditional representation of the palatal lateral /ʎ/ and our hypothesized representation /ʎj/. Our data used in this study come from *OcOr : a Corpus of Occitan Oral Narratives* (Vergez-Couret and Carruthers, 2018). Specifically, we use *OOC (Occitan, oral, contemporary)*, which is a sub-corpus of *OcO*r that contains stories as told by modern storytellers in their contemporary varieties of Occitan.

The recordings were taken at two separate storytelling events in Toulouse, France, in 2016. In total, there are 16 recordings in the *OOC* sub-corpus and feature a total of four speakers : two who speak Gascon (one male, one female) and two who speak Languedocien (one male, one female). All speakers are bilingual in French. We selected this corpus of recordings for study given that the data was collected relatively recently, which is often difficult with endangered minority languages, and we were not able to access native speakers of Gascon and Languedocien to collect novel data. Additionally, this corpus provides us with language in context, rather than word list items; we are better able to observe word-final phenomena which may be influenced by the following word.

3. Word-final consonant clusters

In this section, we analyse word-final complex consonant clusters in Gascon and Languedocien. We first describe the methodology that is employed to collect the data from both varieties (section 3.1). Next, we will present the distribution of results for Gascon and account for the possible variants in Strict CV (section 3.2) before doing so for Languedocien (section 3.3). Finally, we conclude this section with a summary of the takeaways from our study of word-final consonant clusters.

3.1. Methodology

We took a random subset of data (approximately 2,500-3,000 words per speaker) by selecting the first recording for each speaker. For some speakers, their second and third recordings were also selected in order to have comparable token counts across speakers. We used the transcripts to find all instances of word-final clusters. We exclude all tokens which end in bound morphemes because we are interested in how clusters which are simultaneously word-final and stem-final are treated. After identifying all tokens in the transcripts eligible for analysis, we used *Praat* (Boersma & Weenink, 2024) to locate them in the recordings. Using auditory and acoustic cues, we impressionistically coded each token as falling into one of five categories based on its phonetic form: (1) no coda (both consonants deleted), (2) schwa inserted following

the cluster, (3) only first segment pronounced, (4) both segments pronounced (before a pause or a word which starts with a consonant), and (5) both segments preserved but second resyllabifies as the onset of the following word. We additionally coded each cluster according to the phonemes which comprise the cluster.

3.2. Gascon

In this section, we present the results of the data that we collected from the two speakers of Gascon in the corpus (section 3.2.1). We demonstrate that Gascon allows word-final consonant clusters to be pronounced and has a strong tendency to delete the second consonant. We then analyze these results in Strict CV (section 3.2.2).

3.2.1. Results

For Gascon, we identified a total of 147 tokens eligible for analysis. 126 of these tokens contain only two word-final consonants while 21 contain three. All instances 21 instances are forms of two words: *temps* 'time' and *tostemps* 'always'. We analyse these words separately from the others. Focusing first on tokens with only two consonants, the distribution of our data are shown in Table 1.

Table 1. Distribution of tokens by surface form and consonant cluster identity. "stop" represents any plosive and all remaining characters represent the IPA symbol.

	Ø *donc* [du] 'therefore'	**Final [ə]** *vist* [vistə] 'seen'	**C_1** *vist* [vis] 'seen'	**C_1C_2** *hòrt* [ɔrt] 'very'	**$C_1.C_2$** *dens* [den.s] 'in'	**Totals**
n + stop *dunc* /dunk/ 'therefore'	6	7	63	3	10	89
n + s *dens* /dens/ 'in'	16	-	2	-	4	22
r + stop *hòrt* /ɔrt/ 'very'	-	-	6	1	-	7
r + N *torn* /turn/ 'tower'	-	-	2	-	-	2
s + stop *vist* /vist/ 'seen'	-	1	4	1	-	6
	22	8	77	5	14	126

Overall, we find that only the first consonant is pronounced more frequently than any of the other variants for which we coded (61.11%; 77/126 tokens). However, there are other times in which both consonants are pronounced word-finally (3.97%; 5/126 tokens), and even tokens in which the second consonant resyllabifies as the onset of the following word (11.11%; 14/126 tokens). Additionally, there are instances where speakers pronounce both consonants and insert schwa after the second consonant (6.35%; 8/126 tokens). We return to these the forms discussed previously in this paragraph in our phonological analysis section (section 4.2.2).

Surprisingly, we see instances in our data set in which both consonants are deleted (17.46%; 22/126 tokens). According to previous descriptions of Gascon, both consonants should not be eligible for deletion given that only the second consonant (described as extrametrical) is eligible for deletion (Sauzet, 2004; Oliviéri and Sauzet, 2016). Taking a closer look at the words which our speakers produce with the consonants deleted are words which are similar in French (e.g., *davant* /davant/,

Occitan; *devant* /dəvɑ̃/, French; ‘before’). We therefore postulate that proximity to the French form is perhaps influencing our speakers to produce exceptional forms. This is not the first time that contact has been suggested for variation away from Occitan norms for Gascon: Mooney and Hawkey (2019) suggest contact is the reason for the increased usage of [j] for /ʎ/. We therefore do not consider these forms in our phonological analysis (section 3.2.2)

Turning now to the exceptional nature of *temps* ‘time’ and *tostemps* ‘always’, we present the distribution of these tokens in Table 2. We find that there are two prominent trends which emerge: (1) only the first consonant is pronounced (57.14%; 12/21 tokens) and (2) only the first and third consonants are pronounced, meaning the second consonant is deleted (33.33%; 7/21 tokens).

Table 2. Distribution of words which may have three underlying consonants: *temps* and *tostemps*.

	C_1 [tem]	**$C_1C_2C_3$** [temps]	**C_1C_3** [tems]	**$C_1.C_3$** [tem.s]	**Totals**
temps /tɛmps/ ‘time’	1	2	5	2	10
tostemps /tustɛmps/ ‘always’	11	-	-	-	11
	12	2	5	2	21

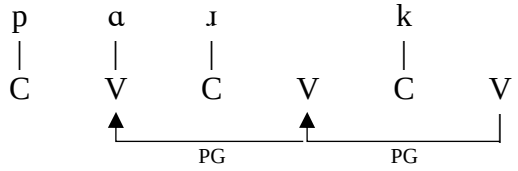
Given the exceptional nature of *temps* ‘time’, we set these tokens aside in our phonological analysis. However, we postulate that the [p] in instances where it is pronounced may be epenthetic rather than phonemic. Given the *temps*’ similarity to the word in French, *temps* /tɑ̃Z/ ‘time’ where /Z/ only appears in liaison contexts, we postulate that speakers do not associate /p/ as belonging to this words underlyingly, even in Gascon. However, we leave such tests and analyses to future work.

As the existing literature has attested, word-final consonant clusters are pronounced in Gascon (Oliviéri and Sauzet, 2016; Mooney, 2022), however, the majority of the time the second consonant is deleted in our data set. We additionally present an analysis of *tostemps* which accounts for its patterning. In the following section, we present a phonological analysis using Strict CV which accounts for the variation revealed by our data.

3.2.2. Phonological analysis

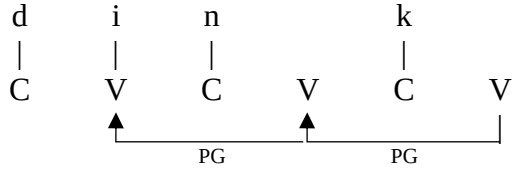
Based on the data we collected for Gascon, we make several conclusions regarding Gascon’s treatment of word-final consonant clusters. First, we address the strong tendency to delete the second consonant. Given that word-final consonants can be pronounced without resyllabifying, we propose that Gascon allows the Final Empty Nucleus (FEN) to be p-licensed. FEN being able to govern the preceding empty nucleus is a language specific parameter that we find in languages which permit word-final consonant clusters. Figure 1 demonstrates this with the English word *park*.

Figure 1. Analysis of English *park* /pɑɹk/ [pɑɹk].



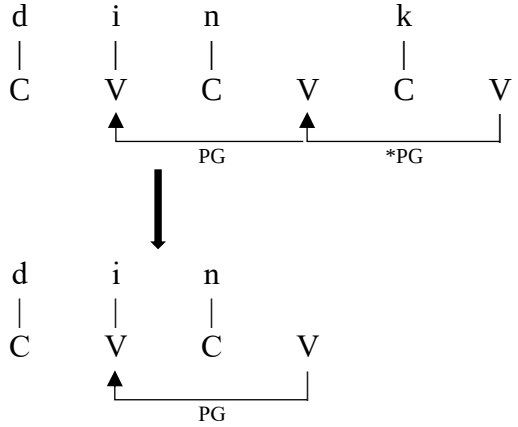
Although FEN appears to have this parametric setting, it appears to be much weaker in Gascon than the one exhibited in English. For example, words may have only the first consonant in a word-final cluster be the one pronounced despite FEN's ability to govern a preceding empty nucleus. For example, a word like *dinc* /dink/ 'until' may be pronounced [dink], reflecting the fact that FEN is p-licensed (Figure 2).

Figure 2. Analysis of *dinc* /dink/ [dink] 'until'.



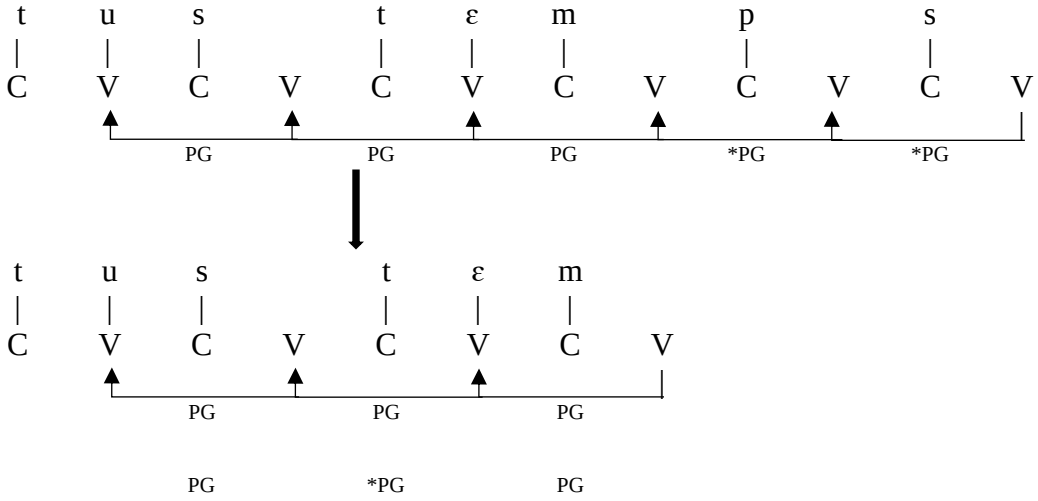
However, it is also the case that it can be pronounced as [din], therefore suggesting that perhaps FEN is unable to properly govern the preceding empty nucleus (Figure 3). In this case, speakers delete the final consonant (/k/ in Figure 3), to repair the ECP violation.

Figure 3. Analysis of *dinc* /dink/ [din] 'until'.



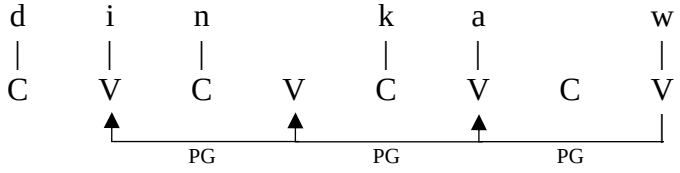
We therefore posit that FEN's government of a preceding empty nucleus is weaker in Gascon than government that is instantiated by a realized nucleus. Alternatively, we hypothesize that FEN is losing this parametric setting in Gascon. We see further evidence of speakers deleting segments which are not properly governed if FEN is not p-licensed in *tostemps* (see Figure 4). Similarly to the previous example, we see that the second and third consonants (/p/ and /s/ respectively) are not properly governed due to violations of the ECP; speakers then delete the last two segments to repair the violations of proper government, resulting in the pronunciation [tustɛm].

Figure 4. Analysis of *tostemps* /tustɛmps/ [tustɛm] ‘always’.



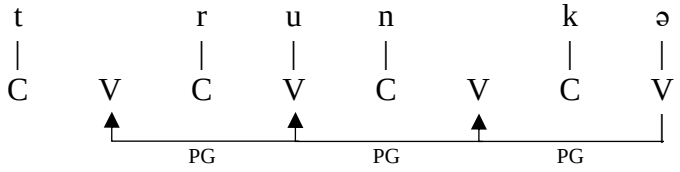
To further describe the variation found in our data, we demonstrate how resyllabification across word-boundaries allows for both word-final consonants to be retained in the Strict CV framework. Figure 5 demonstrates that if the preceding word begins with a vowel, it may fill FEN at the right-edge of the preceding word; this vowel properly governs the empty nucleus in the preceding syllable and prevent repair.

Figure 5. Analysis of *dinc au* /dink aw/ [din.kaw] *som* ‘until the summit’.



Furthermore, our speakers also appear to use schwa insertion as a means of supporting a cluster. We demonstrate such an analysis in Figure 6 where schwa is inserted in FEN; the empty nucleus in the preceding syllable is now properly governed and no longer needs to be repaired.

Figure 6. Analysis of *lo tronc* /trunk/ [trunkə] ‘tree trunk’.



Overall, in Gascon we demonstrate that deletion of all but the first consonant in word-final clusters can be attributed to speakers repairing problems raised as a result of improper government. Furthermore, we demonstrate that resyllabification across word boundaries and inserting schwa word-finally are other mechanisms by which our speakers repair syllables that are not properly governed. In the next section, we present our results for Languedocien and describe the patterns in a phonological analysis.

3.3. Languedocien

Having addressed the representation and production of word final consonant clusters in Gascon, we address the matter in Languedocien. We begin by giving an overview of the data collected from the corpus (section 3.3.1). Then, we offer a phonological analysis of the identified data (section 3.3.2).

3.3.1. Results

For Languedocien, we identified a total of 176 tokens eligible for analysis, the distribution of which is shown in Table 3. Given that there is only once instance of a word with three consonants word-finally, we list tokens of *temps* as a separate row in the table. We will also exclude it from our phonological analysis, as was done for our analysis for Gascon. Overwhelmingly consonant clusters are disfavored as demonstrated by the fact that we have one token of a cluster pronounced in our data set. However, we can see that the following consonants are still in the underlying representation given that they are pronounced when they may be resyllabified as the onset of the following word (9.09%; 16/176 tokens) as well as when schwa is inserted word-finally (3.41%; 6/176 tokens).

Table 3. Languedocien token distribution by surface form and consonant cluster identity. "stop" represents any plosive and all remaining characters represent the IPA symbol.

	Ø *dins* [di] 'in'	**Final [ə]** *donc* [dunkə] 'therefore'	**C_1 only** *torn* [tur] 'tower'	**C_1C_2** *dunc* [dunk] 'therefore'	**C_1C_2** *dins* [din.s] 'in'	Totals
n + stop *dunc* /dunk/ 'therefore'	27	6	73	1	14	121
n + s *dins* /dins/ 'in'	1	-	2	-	2	5
r + stop *canard* /kanard/ 'duck'	2	-	27	-	-	29
r + n *torn* /turn/ 'tower'	-	-	7	-	-	7
r + s *alors* /alɔrs/ 'so'	-	-	6	-	-	6
s + stop *vist* /vist/ 'seen'	1	-	5	-	-	6
temps /tɛmps/ 'time'	-	-	2	-	-	2
	31	6	122	1	16	176

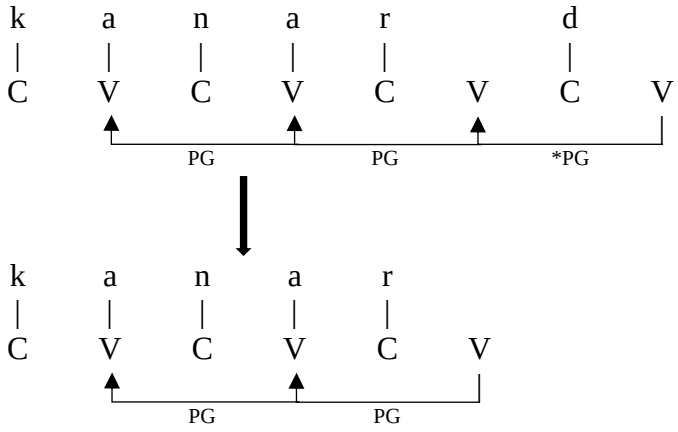
Like Gascon, our speakers delete both consonants word-finally in some cases (17.61%; 31/176 tokens). The words that were produced without final consonants are those which are similar in French (e.g., *quand* /kant/, Occitan; *quand* /qɑ̃/, French; 'when'). We therefore postulate that the proximity to French is perhaps influencing our speakers to produce exceptional forms. Although this would be the first time, to our knowledge, that contact would be implied for phonological changes in Languedocien, much of work on Languedocien comes from data collected before 2000 (see Bec, 1973; Maurand, 1974; Lieutard, 2004; Sauzet, 2004). Given that our data comes from recordings taken in 2016, it allows us to observe updates to Languedocien and capture differences may arise because of further contact with French.

Despite that word-final consonant clusters are permissible in Languedocien per the existing literature (Oliviéri and Sauzet, 2016; Mooney, 2022), our data reveal that the second consonant is nearly categorically omitted except in cases where it can be resyllabified as an onset. In the following section, we offer a phonological analysis of word-final consonant clusters in Languedocien.

3.3.2. Phonological analysis

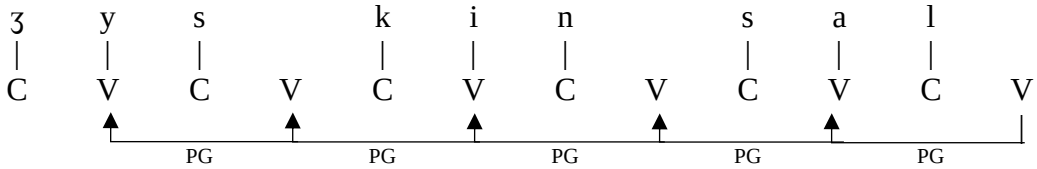
Ultimately, we demonstrate that in Strict CV Languedocien appears to treat consonant clusters similarly to Gascon in that we observe a process of cluster simplification. However, tokens with both consonants pronounced are nearly categorically absent in our Languedocien data. In this way, we see no evidence that FEN in Languedocien has the parametric setting whereby it is p-licensed. As Figure 7 illustrates for *canard* /kanard/ ‘duck’, the preceding nucleus of FEN is empty, therefore resulting in a violation of the ECP. Speakers must repair the sequence.

Figure 7. Analysis of *canard* /kanard/ [kanar] ‘duck’.



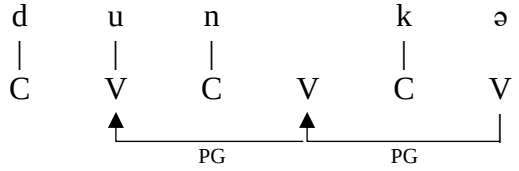
In addition to deleting the final consonant, speakers can repair this violation of the ECP by resyllabifying the final consonant as the onset of the following word. Figure 8 demonstrates that FEN is now filled by the nucleus of the following word, therefore leading to the ECP being satisfied.

Figure 8. Analysis of *jusqu’ins al* /ʒyskins al/ [ʒyskin.sal] *matin* ‘until the morning’.



Speakers also repair violations of the ECP by inserting schwa in FEN. Figure 9 shows demonstrates that schwa satisfies the conditions for proper government to avoid a violation of the ECP.

Figure 9. Analysis of *donc* /dunk/ [dunkə] ‘therefore’.



Overall, in Languedocien we demonstrate that deletion of all but the first consonant in word-final clusters can be attributed to speakers repairing problems raised as a result of improper government. Our results also suggest that FEN is not parametrically set to license the preceding consonant and therefore is unable to govern the preceding empty nucleus. Further, we demonstrate that resyllabification across word boundaries and inserting schwa word-finally are other mechanisms by which our speakers repair syllables which are not properly governed. We summarize the results of the portion of our study on word-final consonant clusters in the following section.

3.4. Summary of word-final clusters

We see that both Languedocien and Gascon permit the pronunciation of word-final clusters. However, the frequency at which they are pronounced and in what contexts differs between the two varieties. In Gascon, word-final consonant clusters may be pronounced without repair while in Languedocien, doing so is quasi-categorically disallowed. We propose that the reason for such hinges on the ability of FEN to license the preceding consonant, and therefore govern a preceding empty nucleus in Gascon, which FEN is unable to do in Languedocien. Therefore, differences in representation can account for the differences in variation that are shown in our data. Additionally, we show that the mechanisms for repair are the same in both varieties. Having established these differences in representation which influence the realization of word-final consonant clusters in both varieties, we deploy our understanding of the treatment of word-final consonant clusters in the following section regarding the palatal lateral.

4. Palatal laterals

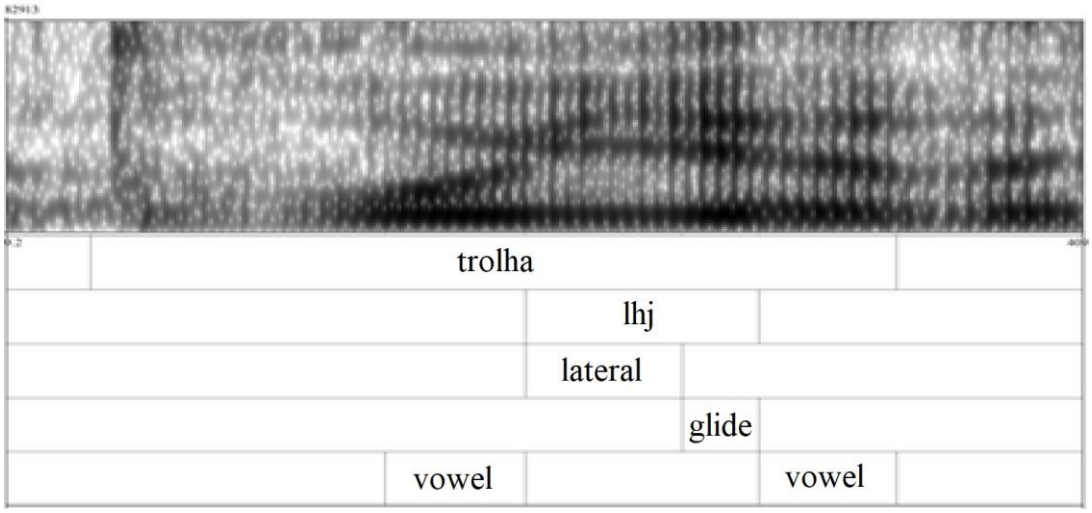
We now turn our attention to the part of this study which seeks to analyze the variability of the palatal lateral in both Gascon and Languedocien. We will first discuss how our data was collected and coded (section 4.1). Next, we will present the distribution of the data and a phonological analysis of the results for Gascon (section 4.2) before doing so for Languedocien (section 4.3). Finally, we conclude this section with a summary of the differences between how /ʎ/ is realized in Gascon in comparison to Languedocien (section 4.4).

4.1. Methodology

Using the transcripts of the audio recordings, we found all instances of /ʎ/ by searching for the digraph *lh*. We can perform a search in such a way given that the creators of the corpus followed the standardized orthographic conventions laid out by the Institute for Occitan Studies, which exclusively uses *lh* to denote phonemic palatal laterals and

palatal laterals are not expressed using any other grapheme (Institut d'Estudis Occitans, 2024). After having identified 181 instances of /ʎ/ in the transcripts, we located each occurrence in the audio recordings and segmented them by hand using *Praat* (Boersma and Weenink, 2024). Following the methodology used by Mooney & Hawkey (2019), we impressionistically coded each token of /ʎ/ as a palatal lateral [ʎ]. a palatal glide [j] based on our own auditory judgements. Additionally, we marked the presence of an accompanying glide-like element, which we code as [ʎj] based on visual "inspection of the spectrogram and identification of dynamic formant transitions in the CV transition" (Mooney & Hawkey, 2019: 292). We additionally marked the onset and offset of the lateral or glide, as well as the glide-like element if present (see Figure 10). For all variants, "the onset of the variant was labelled at the beginning of the first full glottal pulse; the lateral offset was labelled at the point where F2 began to change, at which point the onset of the following glide-like transition was marked. The offset of the glide-like transition (or glide variant) was labelled at the point of inflection of the formant transitions into the following vowel (cf. Colantoni, 2004: 95)" (Mooney & Hawkey, 2019: 292-293).

Figure 10. Intervocalic token of /ʎ/ (*trolha* /troʎa/ 'press') in *Praat,* produced by a male speaker of Gascon.



We used a script to automatically measure F1 for palatal laterals, palatal glides, and accompanying glide-like elements.[3] Tokens that had been impressionistically marked as [ʎ] and [ʎj] were then recoded according to their F1 value to distinguish true palatal laterals vs. alveolar laterals. Given that palatal laterals tend to have an F1 somewhere between 300 and 400Hz (adapted from Zampaulo, 2019), tokens with an F1 lower than ~400Hz were coded as [ʎ] or [ʎj], while tokens with an F1 higher than ~500Hz were coded as [l] or [lj]. We additionally coded the word-position (initial vs. intervocalic vs. final) and the identity of any adjacent vowels (palatal vs. non-palatal)

[3] We additionally measured the duration of the initial lateral segment or glide segment as well as the accompanying glide-like element. Although we do not report the results here, an analysis shown in Owens (2023) demonstrates that there is no significant difference between the duration of the lateral element and the accompanying glide in Gascon, which is consistent with the results found by Mooney and Hawkey (2019) for Gascon. In Languedocien, however, Owens (2023) shows the duration of the lateral is significantly longer than the duration of the accompanying glide.

or consonants (morphological /s/) for each token. We additionally note that morphological /s/ is never pronounced in any of our tokens of the palatal lateral.

4.2. Gascon

In this section, we address the results regarding the realization of the palatal lateral in Gascon. We first present the distribution of results in all word-positions (section 4.2.1). However, in the phonological analysis section we will focus predominantly on the realizations in word-final position (section 4.2.2).

4.2.1. Results

Table 4 shows the distribution of tokens produced by the Gascon speakers. We find that [ʎj] is the most frequent variant in that it accounts for 69.77% (60/86 tokens) of the data, followed by [j] at 17.44% (15/86 tokens), [lj] at 11.63% (10/86 tokens) and [ʎ] at 1.16% (1/86 tokens). There are no tokens of [l] present in the Gascon data.

Table 4. Gascon token distribution by surface form and phonological context. "I" represents /i e ɛ/ and "V" represents all other vowels.

	Word-initial	**Intervocalic**				**Word-final**				
	#_I	**I_I**	**I_V**	**V_I**	**V_V**	**I_#**	**V_#**	**I_s#**	**V_s#**	**Totals**
[ʎ] *aulhers* [awʎer] 'shephard'	-	-	-	1	-	-	-	-	-	1
[ʎj] *uèlhs* [wɛʎj] 'eyes	7	2	5	27	16	-	2	1	-	60
[lj] *lhèit* [ljɛjt] 'bed'	1	-	1	4	3	-	-	-	1	10
[l] N/A	-	-	-	-	-	-	-	-	-	0
[j] *sorelh* [sɔrɛj] 'sun'	-	2	7	1	-	2	2	1	-	15
	8	4	13	33	19	2	4	2	1	86

As other works on the palatal lateral in Romance languages have found (e.g., Colantoni, 2004; Mooney and Hawkey, 2019), /ʎ/ is realized with a glide-like element which accompanies the lateral segment. In this work, we treat the glide-like element as its own segment given that /ʎ/ is only realized once without it in our data. We see that word-initial tokens are exclusively those which have a lateral segment followed by a glide ([ʎj] and [lj]). This lack of [j] word-initially is consistent with the findings presented by Hawkey and Mooney (2019).

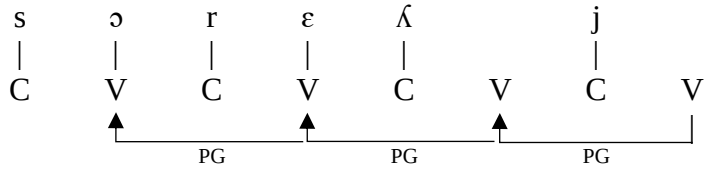
Turning now to intervocalic position, we find that [j] is the most frequently produced variant when the preceding vowel is palatal at 52.94% (9/17 tokens). When the preceding vowel is not palatal, however, [j] is only produced once (1.92%; 1/52 tokens). To this end, our data suggest that /ʎ/ gliding in Gascon is triggered intervocalically when the preceding vowel is palatal. We find a similar effect in word-final position: [j] is produced in 75% of the instances which follow a palatal vowel (3/4 tokens). However, the word-final position does play some sort of role in

conditioning /ʎ/ gliding that intervocalic position does not because even when /ʎ/ follows a non-palatal vowel, [j] is produced 40% of the time (2/5 tokens). Although this effect is much larger than the one found following non-palatal vowels in intervocalic position, we suggest that the reader interpret the significance of these percentages with caution due to the small number of word-final tokens (n=9).

4.2.2. Phonological analysis

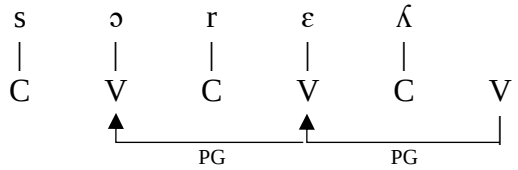
Given that this study aims to test whether variation in the production of word-final complex segments can be attributed to differences in representation, we analyse the realization of /ʎ/ using the analyses proposed in Section 3.2.2 for word-final clusters. For the purposes of this analysis, we test our first analysis with the assumption that the traditional /ʎ/ is represented as /ʎj/ for our speakers. In Figure 11 we see the word *sorelh* /sɔrɛʎ/ [sɔrɛʎj] represented in Strict CV following this assumption.

Figure 11. Analysis of *sorelh* /sɔrɛʎ/ [sɔrɛʎj] ‘sun’.



In this analysis, we see that ECP is not violated given that FEN is p-licensed in Gascon (shown in Section 3.2.2), therefore governing the preceding empty nucleus, despite that one may think such a sequence of segments word-finally would not be supported given that principles of sonority sequencing are violated. This points to the fact that /ʎ/ remains a single segment rather than two (i.e., /ʎj/). Furthermore, if /ʎ/ were actually /ʎj/, we would anticipate that some percentage of the time our speakers would repair the form such that the more frequent variant in our data would be [sɔrɛʎ] as a result of a weak or variable p-licensing of FEN. Our data on /ʎ/ variation reveal, however, that this is not the case: our speakers never produce a lateral segment that is not accompanied by the palatal glide. Indeed, the most frequent form word finally is [j]; We propose that the glide-like elements which we have hypothesized are separate segments in the Gascon tokens coded as [ʎj] and [lj] are likely coarticulatory or a byproduct of variation in articulatory gestures rather than separate segments. Figure 12 shows the final analysis for *sorelh* in Gascon, without /j/ as a segment.

Figure 12. Analysis of *sorelh* /sɔrɛʎ/ [sɔrɛʎ] ‘sun’.



As we have shown in this section, /ʎ/ shows evidence of being a single segment in Gascon because it is not influenced by the process of word-final cluster reduction, which all other clusters may undergo. Instead, palatal lateral gliding in Gascon may be better accounted for by analyses similar to those on Spanish *yeismo* (e.g., Lipski, 1989;

Zampaulo, 2019), which we leave to future work. In the following section, we will address our results for the palatal lateral in Languedocien.

4.3. Languedocien

In this section, we will first present the distribution of our results regarding the realization of the palatal lateral that occur in the corpus (section 4.3.1). Given that Languedocien only maintains the phonemic palatal lateral intervocalically and word-finally, we only present results for these word positions. We then focus on the results for the word-final position in our phonological analysis (section 4.3.2).

4.3.1. Results

Table 5 shows the distribution of tokens produced by the Languedocien speakers. We find that [ʎj] is the most frequent variant being produced in that it accounts for 56.84% (54/95 tokens) of the data, followed by [l] at 20.00% (19/95 tokens), [ʎ] at 14.74% (14/95 tokens), [lj] at 4.21% (4/95 tokens), and [j] at 4.21% (4/95 tokens).

Table 5 Languedocien token distribution by surface form and phonological context. "I" represents /i e ɛ/ and "V" represents all other vowels.

	Intervocalic				**Word-final**				
	I_I	**I_V**	**V_I**	**V_V**	**I_#**	**V_#**	**I_s#**	**V_s#**	**Totals**
[ʎ] *filh* [fiʎ] 'son'	-	1	-	-	9	-	4	-	14
[ʎj] *vièlh* [vjɛʎj] 'old'	3	40	-	8	3	-	-	-	54
[lj] *vièlh* [vjɛlj] 'old'	-	-	1	1	1	1	-	-	4
[l] *filh* [fil] 'son'	-	1	-	3	9	5	1	-	19
[j] *vièlh* [vjɛj] 'old'	-	1	-	1	1	1	-	-	4
	3	43	1	13	23	7	5	0	95

Like for Gascon, we find that /ʎ/ is often accompanied by a glide-like element which we transcribe here as a segment. There are no tokens word-initially in our data because there are no phonemic word-initial palatal laterals in Languedocien. Regardless of word-position and phonological context we find that /ʎ/ gliding is not common in Languedocien. To our knowledge this is the first time that a study has shown /ʎ/ gliding in Languedocien. Following Mooney and Hawkey's (2019) work on Gascon, we posit this may be a result of contact with French.

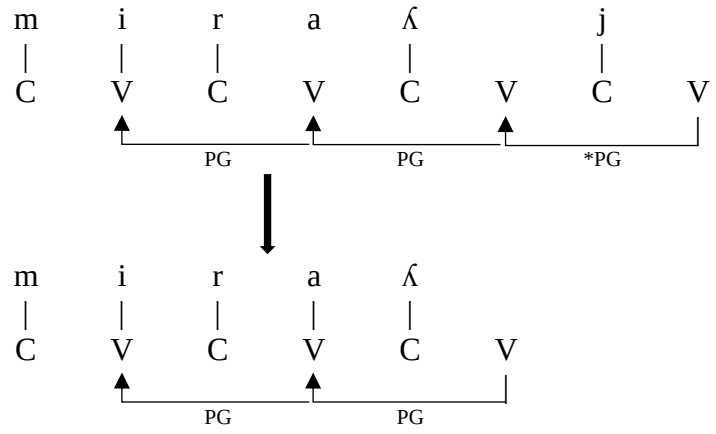
In intervocalic position, [ʎj] is the default variant, occurring in 85.00% of those tokens (51/60 tokens). Depalatalization occurs more often when the preceding vowel is non-palatal (35.7%; 5/14 tokens) in comparison to when the preceding vowel is palatal (2.17%; 1/46 tokens). We also note the variants with an accompanying glide, [ʎj] and [lj], are the most frequent intervocalic variants (88.33%; 53/60 tokens) in comparison to variants which have only one segment (11.67%; 7/60 tokens).

Turning to word-final position, we see that 45.71% (16/35 tokens) maintain a lateral that is palatal and that 48.57% (17/35 tokens) depalatalize the lateral. A lateral remains palatal when the preceding vowel is also palatal (57.14%; 16/28 tokens) more often than when the preceding vowel is not palatal (14.29%; 4/28 tokens). Overall, our data shows that word-final depalatalization of /ʎ/ occurs in Languedocien, although not all tokens depalatalize. We find that the greatest effect is found when looking at the absence of the accompanying glide: a lateral accompanied by a glide, [ʎj] and [lj], constitutes 14.29% (5/35 tokens) of tokens in this context, while variants with one segment, [ʎ], [l], and [j], constitute 85.71% (30/35 tokens).

4.3.2. Phonological analysis

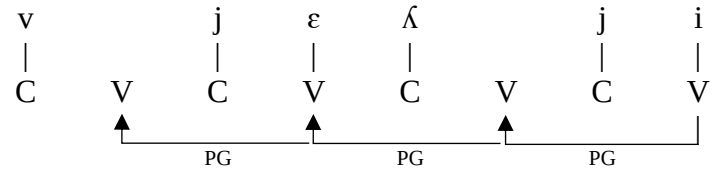
Given that we aim to test whether variation in word-final complex segments can be attributed to differences in representation, we analyse the realization of /ʎ/ using our phonological analysis of word-final consonant clusters in Languedocien (Section 3.3.2). In our analysis of Languedocien, FEN is unable to govern a preceding empty nucleus. We first assume that /ʎ/ is represented as /ʎj/, with the accompanying glide-like element being a separate segment. Figure 13 illustrates that a word which ends in this representation violates ECP in Languedocien, thus resulting in repair by deleting [j] given that FEN cannot govern a preceding empty nucleus. This analysis then accounts for 85.71% (30/35 tokens) of our data.

Figure 13. Analysis of *miralh* /miraʎj/ [miraʎ] ‘mirror’.



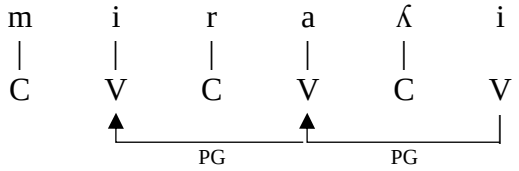
However, to know whether the remaining five tokens constitute a problem for our analysis or not, we more closely examined the five tokens and found that all five are cases whereby the final segment resyllabifies into the onset of the following word. Recalling from section 3.3.2, resyllabification across word-boundaries is a repair mechanism that Languedocien allows to support word-final clusters. Figure 14 demonstrates this analysis.

Figure 14. Analysis of *vièlh i* /vjɛʎji/ [vjɛʎji] *dit* ‘old he says’.



Although we show here that /ʎ/ in Languedocien may be represented as /ʎj/ to account for the variation that we see in our data, we must also consider the traditional single segment representation. As Figure 15 shows below, /ʎ/ in coda position constitutes a well-governed structure in Languedocien word-finally.

Figure 15. Analysis of *miralh* /miraʎ/ [miraʎ] ‘mirror’.



In an analysis such as the one presented in Figure 15, the accompanying glide-like element would be purely coarticulatory. However, a purely articulatory based account does not explain why accompanying glide-like elements are frequent in our Gascon data while they are categorically absent from our Languedocien data, barring instances of resyllabification across a word-boundary. Furthermore, existing literature has claimed that the rule word-finally in Languedocien is depalatalization (Bec, 1973; Oliviéri and Sauzet, 2016), yet we find approximately as many instances of [ʎ] as [l]. We find that tokens of depalatalized laterals are not only found word-finally, but intervocalically as well. To this end, we posit that depalatalization may be triggered by a preceding non-palatal vowel rather than word-position as shown by our distribution of tokens in Table 5 in section 4.3.1. Ultimately, we propose that the palatal lateral in Languedocien, traditionally represented as /ʎ/ can be represented as /ʎj/ as a result of its ability to interact with processes which affect word-final consonant clusters as well as the inability of articulatory factors to account for the absence of a glide-like element word-finally.

One may additionally question from our data whether /ʎ/ is primitive at all in Languedocien, or whether it is a CV template of {l, i}[4], similar to {i, l} for the Italian definite article where licensing of /l/ by a following palatal vowel results in palatalization (Faust et al., 2018). Preliminary analyses that we have conducted based on the palatal licensing account have thus far been unable to capture the distribution of our data, which may in part be due to low token counts in word-final position as well as our data being provided by only two speakers of Languedocien. At this juncture, we leave the status of /ʎ/ as a primitive feature in Languedocien to future inquiry.

5. Conclusion

In this study, we aimed to show that complex segments can be reanalysed as two segments, and thus become sensitive to structural processes in the phonology of languages which possess processes that affect both complex segments and clusters.

[4] We reverse the ordering of /i/ and /l/ from that of Faust and colleagues (2018) because, unlike Italian, /ʎ/ is permitted in word-final coda position in Languedocien and does not occur in word-initial position. Therefore, there is no evidence that an unassociated /i/ must precede /l/, but there is evidence that it must follow /l/.

We demonstrated that Gascon and Languedocien have different representations regarding consonant clusters in that Gascon has the parametric setting in which FEN is p-licensed and can govern the preceding vowel, therefore allowing for the pronunciation of complex consonants word-finally. Languedocien, however, does not have this parametric setting. In applying these analyses to the palatal lateral phoneme, we argue that it remains one segment in Gascon, given that our data do not show evidence that it does not conform to the same structural representation that word-final complex consonants do. In Languedocien, however, we argue that the opposite is true: the palatal lateral phoneme can be reanalyzed as /ʎj/.

We additionally have highlighted several updates to our understanding of the phonology of Gascon and Languedocien. In Gascon we demonstrate that there may be a change in progress whereby FEN is losing the ability to govern the preceding consonant, therefore resulting in the more frequent deletion of final consonants in word-final clusters. Additionally, we have shown that the word-final depalatalization rule that has been pervasive in the literature on Languedocien does not fully describe the phenomenon, given that approximately half of all tokens do not depalatalize. We attribute our ability to examine this rule more closely to the increased amount of work on technologies that allow for the phonetic examination of these segments.

Acknowledgments

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