ON THE SPECIFICATION OF CORONALS

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We present the relation between assimilatory asymmetries in Central Catalan and the underspecified character of Coronal. We account for differences in the assimilatory behaviour of coronals by placing Lateral and Strident under Coronal. We assume that these features are dependents of Coronal and that this justifies the presence of the unmarked articulator in the underlying representations of strident and lateral coronals. The assimilatory possibilities of centralised consonants in Alguerese Catalan force us to argue that Lateral and Strident are double-linked features. We consider an alternative analysis based on Configurational Constraints and we demonstrate that this analysis fails to capture the gliding processes which affect some complex segments in Majorcan Catalan and Occitan. The organisation of features allows us to provide a simple and unitary account, in this way the enrichment of the representations derives in a simplification rule component.

Universal Grammar provides a markedness theory which supplies information as to which features are underspecifiable. In this way, the unmarked articulator node seems to be the Coronal one and thus it must be absent in underlying representations. The purpose of this paper is to provide evidence in support of Underspecification theory and to use this model to investigate the way a feature predicted to be absent in underlying representations can be active in the phonology of a language.

In line with current phonological research, our proposal is consistent with the claim that the burden of explanation should be in the representational component rather than in the rule

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component. Our argumentation is based on processes of assimilation, centralisation and gliding which can be found in Catalan and Occitan.

This paper is organised as follows. In Section 1 we present the relation between assimilatory asymmetries in Central Catalan and the underspecified character of Coronal and we hypothesize that these asymmetries have their origin in the Feature Geometry. We conclude that Lateral and Strident are dependents of Coronal and that this justifies the presence of the unmarked articulator in the underlying representations of lateral and strident coronals. We also sketch two earlier analyses of the way Coronal is introduced in representations: Avery-Rice (1989) and Paradis-Prunet (1989). We argue that such analyses cannot solve the problem we present. Section 2 deals with data coming from Alguerese Catalan. We argue from the assimilatory possibilities of centralised consonants that Lateral and Strident are double-linked features. We consider an alternative analysis based on Configurational Constraints and in Section 3 we demonstrate that this analysis fails to capture the gliding processes that affect some complex segments in Majorcan Catalan and Occitan. We conclude that the processes considered must be treated in a unified manner and not as accidents. The organisation of features allows us to provide a simple and unitary account. In this way we follow the usual strategy to obtain that the enrichment of the representations derives in a simplification rule component.

1. Assimilatory Patterns in Central Catalan

It has been observed that coronals behave asymmetrically with respect to other consonants in some languages and this is the case of the coronal nasal and the stop in Catalan, which assimilate to all places of articulation. It is generally assumed that this behaviour derives from the general theory of Underspecification.

The asymmetric pattern of coronals can be illustrated by the data in (1) which correspond to an optional process of stop assimilation in Central Catalan. While the coronal stop assimilates to all places of articulation, as can be seen in (1a), labial and velar stops in (1b) and (1c) assimilate

only within their primary content node. This is exactly the behaviour that we predict by underspecifyng the Coronal node.

(1)

a.		b.	
se [t]	'seven'	ca [p]	'no'
se [m] mans	'seven hands'	ca [m] mà	'no hand'
se [p,] focs	'seven fires'	ca [p,] foc	'no fire'
se [l] línies	'seven lines'	ca [p] signe	'no sign'
se [t, ʃ]ais	'seven lambs'	ca [p ʃ]ai	'no lamb'
se [ʎʎ]ibres	'seven books'	ca [p ʎ]ibre	'no book'
se [k] cases	'seven houses'	ca [p] casa	'no house'
se [d] dones	'seven women'		
se [b b]eus	'seven voices'		

c.

po [k]	'few'
po [k] pa	'few bread'
po [k] foc	'few fire'
po [k] sol	'few sun'
po [k ʃ]ai	'few lamb'
po [k ʎ]ibre	'few book'
po [k] cas	'few case'

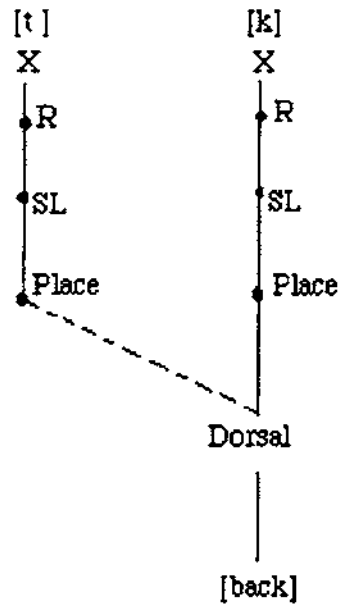
(Mascaró(1976))

Following the strategy that phonological processes are best explained through a focus on the representational component, we view the assimilation process as a simple operation of spreading, which takes place from right to left and only to an empty position. To make this clear, compare (2a) and (2b). The Dorsal content node spreads to the empty Place node in (2a), but spreading is blocked in (2b) because the Place node of the first consonant has the dependent Labial node and we don't allow cases of spreading triggering delinking. (Note that,

strictly speaking, the SL and Place nodes in the representation of [t] are not present underlyingly).

(2)

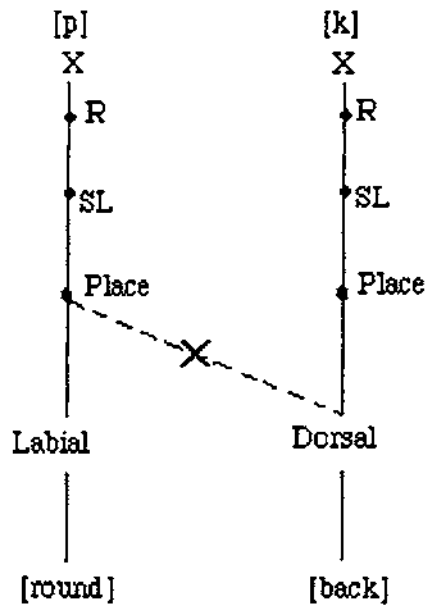
a.



se [t] [k]ases —> se [kk] ases

'seven houses'

b.



ca [p] [k]asa —> ca [pk]asa

'no house'

Consider now the nasal assimilation data. The coronal nasal, as does the coronal stop, patterns as if it has no specified Place of articulation (see the examples in 3a). The other nasals assimilate only within their own primary content nodes: the labial in (3b) can assimilate to a labiodental, and the velar and palatal nasals in (3c) do not assimilate at all.

(3)

a.		b.	
só [n]	'they are'	so [m]	'we are'
só [m] pocs	'they are few'	so [m] pocs	'we are few'
só [ɱ] feliços	'they are happy'	so [ɱ] feliços	
só [n] dos	'they are two'	so [m] dos	
só [n] sincers	'they are sincere'	so [m] sincers	
só [n] rics	'they are rich'	so [m] rics	
só [n, ʒ]ermans	'they are brothers'	so [m ʒ]ermans	
só [n, ʎ]iures	'they are free'	so [m ʎ]iures	
só [ŋ] grans	'they are big'	so [m] grans	

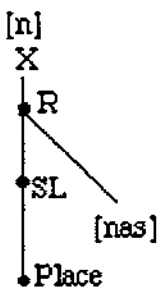
c.

ti [ŋ] pa	'I have bread'
a [ɲ] feliç	'happy year'

(Mascaró (1976))

The assimilation of the coronal nasal is parallel to that of the coronal stop. Its articulation is totally dependent on the following consonant. We predict this behaviour by underspecifing the coronal node in the representation of the nasal in (4).

(4)



If Coronal is the unmarked specification for Place, then we expect to find a unique patterning of Coronals at least in relation to assimilatory processes. But this is not what we find if we look at the behaviour of the lateral and fricative coronals. They pattern as the other consonants do and their assimilatory possibilities are restricted to their own primary content node. We will

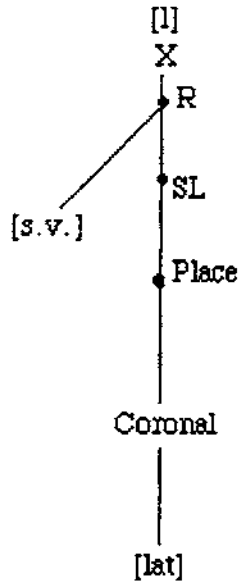
demonstrate that Coronal is present in the underlying representations of [l] and [s] and that this may be used to explain their assimilatory pattern.

Lateral assimilation differs from the assimilation of stops and nasals in that laterals assimilate only if they can preserve their coronal character, as can be seen in (5).

(5)	e [l]	'the'	
	e [l] pa	'the bread'	
	e [l] foc	'the fire'	
	e [l] dia	'the day'	
	e [l] sol	'the sun'	
	e [l] ric	'the rich'	
	e [l, ʒ]ermà	'the brother'	
	e [l, ʎ]ibre	'the book'	
	e [l] gos	'the dog'	(Mascaró (1976))

In the analysis of both the stop and the nasal coronals we have accounted for the assimilation to all places of articulation by postulating the absence of a specified Coronal node in those segments. The general restriction of laterals to the Coronal articulator, as argued by Levin (1988) among others, can be expressed in feature geometry by making Lateral a daughter of the Coronal node. The representation of the coronal lateral, with a specified Coronal node, given in (6) accounts straightforwardly for its assimilatory possibilities.

(6)



There is phonological evidence of a significant association between Lateral and Coronal even in the case of palatal and velar laterals. These Dorsal laterals have also a Coronal node, consistent with the claim that the feature lateral is a dependent of Coronal.

Independent support for this position can be found in the alternation of the stop and fricative allophones of the voiced obstruents in Catalan, Basque and Spanish. We follow the standard analysis for the general process. Basically, we assume Continuant Spreading from left to right, i.e. from a segment in a Rime to a segment in the Onset of the following syllable, and [- cont] as the unmarked value. Catalan has both palatal and velar laterals and in this language Continuant Spreading regularly takes place from left to right as can be seen in (7a). The stop appears after a [- cont] segment and after a pause. Instead the fricative appears when the voiced obstruent follows a [+cont] segment as in the last two examples. It has been observed that the [+continuant] value does not spread in homorganic sequences. In the examples of (7b) laterals assimilate to the following dental, the homorganicity requirement is met and the spreading of the continuity value is blocked. The same situation holds in the case of the palatal lateral. Clearly, if palatal and velar laterals assimilate to a dental they have to have a Coronal node.

(7) a.

əmbéʒə	'envy'
blát	'wheat'
nɔβə	'new' (fem.)
bízβə	'bishop'

b.

əlkáldə	'mayor'
beʎdíə	'nice day'

We have accounted for the pattern of laterals with respect to assimilatory processes by specifying the Coronal articulator which is predicted to be absent in underlying representations. The consideration of Lateral as a dependent of Coronal justifies the presence of this unmarked articulator. We assume that both palatal and velar laterals are complex segments which branch at the Place node. We will return later to the representation of palatals and the velar lateral as complex segments in relation to gliding processes in Section 3.

Let's describe now the assimilatory possibilities of the coronal fricative. As can be seen in (8a) [s] does not assimilate to a labial or velar segment. In some dialects a progressive assimilatory effect can be observed when the coronal fricative follows a sonorant palatal in (8b). The coronal fricative also assimilates to [r] in the example in (8c) and the resulting segment has been characterised as a fricative untrilled in Mascaró (1976).

(8) a.

mé [s] pa	'more bread'
mé [s] camps	'more fields'
mé [s f]lors	'more flowers'

b.

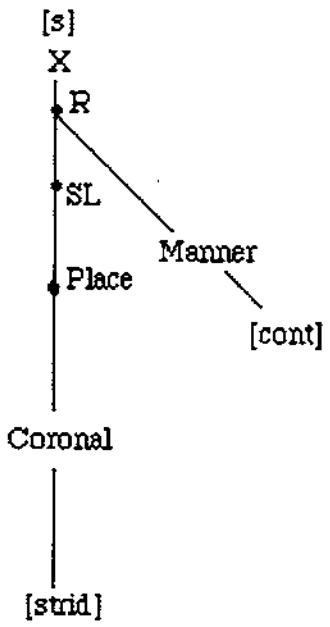
áɲʃ	'years'
áʎʃ	'grains of garlic'

(8) c.

mé [z] [r]oba →me [ɹr]oba 'more clothes'

The behaviour of the coronal fricative which assimilates only within its primary content node and to palatals can be derived straightforward from the presence of Coronal in the representation of [s] in (9).

(9)



Strident is relevant only for coronals and we express this by making the feature Strident a dependent of the Coronal node. As in the case of [l] in relation to Lateral, the specification on the unmarked articulator in the representation of [s] is justified by making Strident a dependent of Coronal. If Lateral or Strident are specified for some segment, then the *Node Generation* convention given in (10) will create automatically a Coronal node. Assuming this we can maintain the unmarked character of Coronal.

(10) *Node Generation*

A rule or convention assigning some feature or node A to some node B creates a path from A to B.

(Archangeli & Pulleyblank (1986))

Two recent papers have focused attention on the specification of the Coronal node. We will consider recent work by Avery-Rice (1989) and Paradis-Prunet (1989). In the former, Catalan data are considered in a way which leads to some misunderstandings. They describe, for example, the velar lateral as a plain one which becames velar in *e [l] gos* 'the dog'. In Catalan, the non-palatal lateral is velar in all contexts it is not the result of a process of spreading. They relate the assimilatory possibilities of segments and the inventory of a given language by means of the Node Activation Condition which establishes that if a secondary content node is the sole distinguishing feature between two segments, then the primary feature is activated for the segments distinguished and therefore it is present in underlying representations. As observed by Cho (1990), the argumentation for the NAC in Avery-Rice (1989) crucially depends on the assignation of a language particular structure for palatals: complex segments in Catalan and non-complex in Sanscrit. But the main problem for this proposal is that it fails to capture the fact that [s] does not assimilate to a non-coronal in Catalan and instead it predicts that [s] assimilates freely.

Paradis-Prunet (1989) have made the proposal that the rule which introduces Coronal as the unmarked articulator applies very early in languages where coronals seem to require a marked articulator and later in most languages. Clearly this generalisation cannot account for asymmetries within a language as those which we have observed between [t] and [n] *vs.* [l] and [s].

In this section, we have considered the assimilatory behaviour of coronal consonants in Central Catalan. We have attributed the asymmetries to the presence *vs.* absence of a specified Coronal node in the underlying representation of these segments. Also we have accounted for

the presence of Coronal in laterals and fricatives by making the features Lateral and Strident terminal dependents of the Coronal node.

2. Centralisation and Double-dependency

Let's turn now to Alguerese Catalan, represented in the examples in (11). In this dialect all sonorant consonants lose their point of articulation before any consonant in word final position and then there is regressive assimilation of place.

(11) a.

l últim	'the last'	l últiŋ kwált	'the last quarter'
áɲ	'year'	ám pasát	'last year'

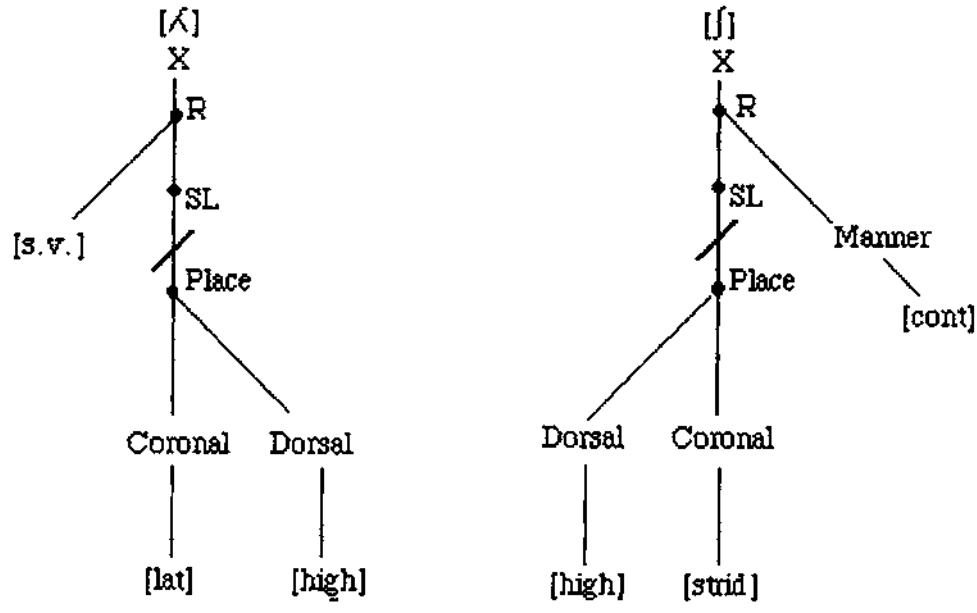
b.

akéʎ	'that-masc.'	akél ditsjunáɾi	'that dictionary'
kaváʎ	'horse'	kaál bó	'good horse'
akéʃ	'this-masc.'	akés paɾáw	'this palace'
akéz galbó	'this coal'		

(Kuen (1932))

Centralisation can be interpreted as a delinking process, an operation of neutralisation which eliminates nodes. The important point here is that the centralisation process in Alguerese has to be formulated as affecting the Place node to obtain unmarked values. If Lateral and Strident are dependents of Coronal this will also entail their exclusion from the representations. In this way, we predict free assimilation of centralised [s] and [l] to all points of articulation, since there will be no specified Coronal node preventing this from occurring. But this is not what happens and the reduced [s] and [l] in (13b) assimilate only within their originally primary content node. Then Alguerese data disallow the representations in (12).

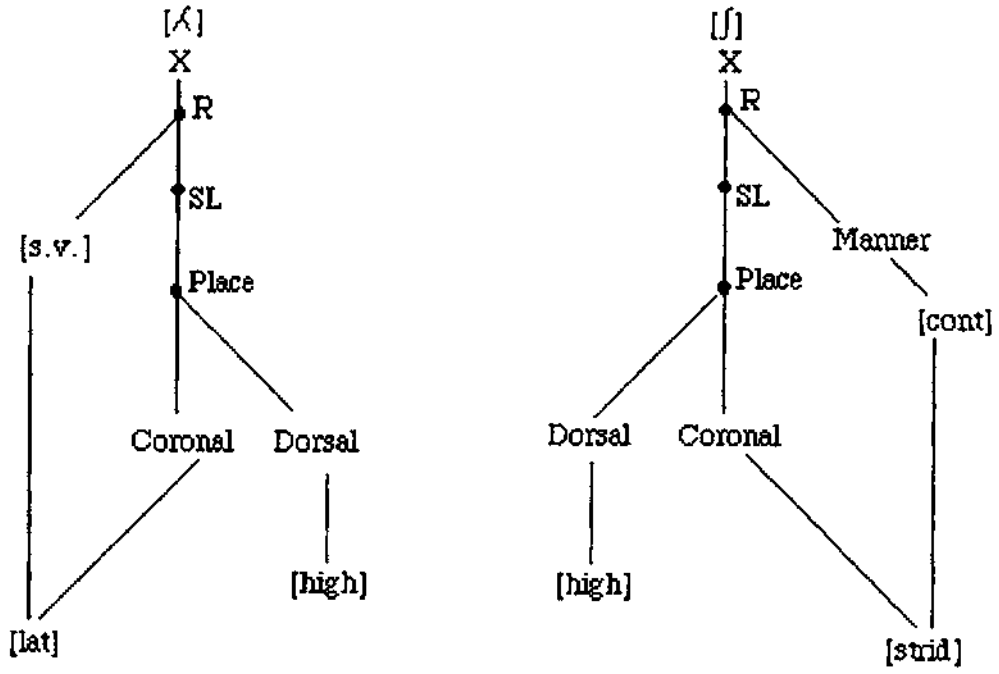
(12)



We see then that the way we have found to account for the assimilatory patterns in Central Catalan is not compatible with the evidence which comes from Alguerese Catalan. This dialect seems to require Lateral and Strident to be linked to the Root node and also some kind of condition constraining their assimilatory possibilities. But we will argue that an explanation can be found which integrates the dialectal variation. Our proposal is based on Feature Geometry and doesn't need to refer to mechanisms like Configuration Constraints, Structure Preservation, or the application of late fix-up rules.

Recently Yip (1990), has proposed that some features may be dependent on more than one superordinate node. She argues that Lateral is one of such features, a double-domination is required and Lateral is placed under both Coronal and Spontaneous Voicing. We propose that the feature representing stridency is also a double-linked one. We consider Strident to be a dependent of both Coronal and Manner. The relevant structures will be the ones in (13) for the palatal lateral and the palatal strident, respectively.

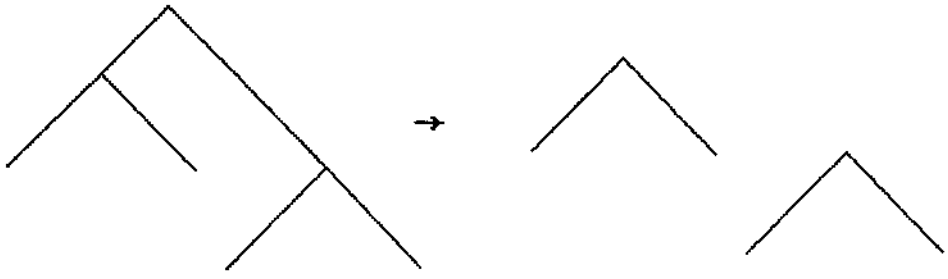
(13)



In this way, the general restriction of laterals and stridents to the Coronal articulator can be expressed by making the corresponding features Lateral and Strident daughters of the Coronal node. We will show that this relation holds even in the case of dialects which centralise. Centralising dialects are illustrated here by Alguerese but the analysis we present can be easily extended to Majorcan Catalan, Occitan and Spanish.

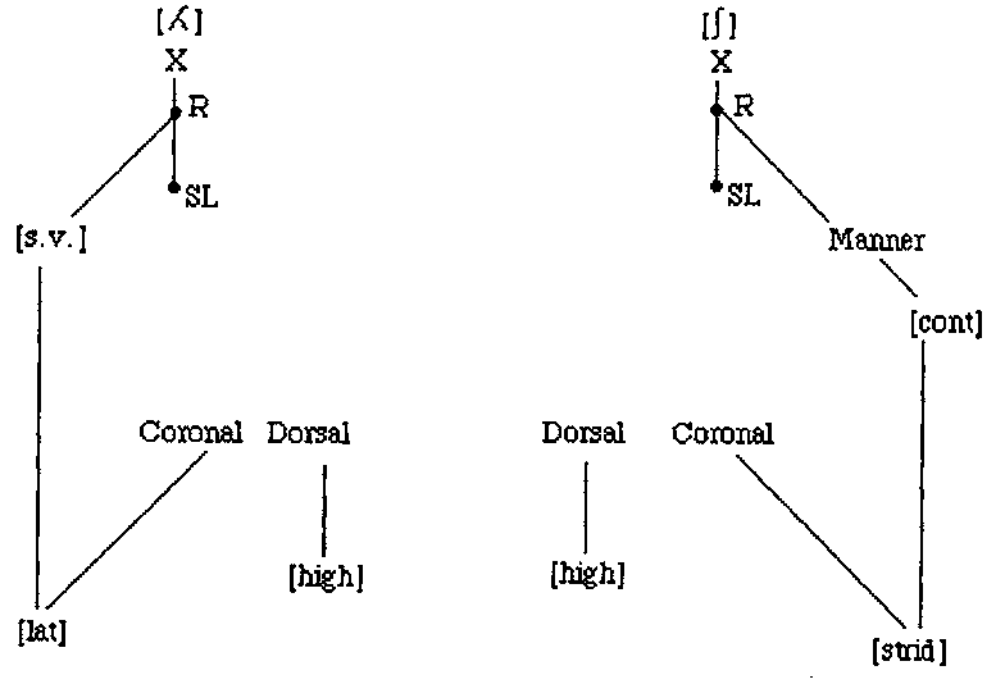
Linking Lateral and Strident to Spontaneous Voicing and Manner, respectively, allows us to maintain the restriction of the assimilatory possibilities to the Coronal node. Following Archangeli-Pulleyblank (1986) we interpret centralisation as a result of a basic operation of deletion. Recall that as illustrated in (14) the deletion of a Macro node does not necessarily result in the deletion of the nodes dominated by this Macro node. The floating nodes will delete if they are not able to link to some other node.

(14)



Centralisation applies to the representations in (13) in Alguerese Catalan and the resulting representations will be the ones in (15). The deletion of the Place node does not entail elision of the Coronal node since there is a linking between Coronal and Lateral or Strident which are also linked to Spontaneous Voicing and Manner, respectively. But the floating Dorsal node will be lost, resulting in centralisation of place. The presence of the Coronal node is crucial to account for the restriction of the assimilatory pattern of centralised laterals and stridents.

(15)



To summarize, we have argued that evidence coming from dialectal variation forces us to characterise Lateral and Strident as doubly-linked elements in Feature Geometry. This allows us

to simplify the explanation of the assimilatory behaviour of coronals. In this way, the enrichment of the representations will derive in a simplification of the possible operations.

An alternative analysis based on Configurational Constraints has been considered in the literature to explain the restriction of laterals to the Coronal articulator. This analysis can be easily extended to stridents. In this approach the observation that if a segment is lateral then it has to have a Coronal node is expressed as a wellformedness constraint (see for instance (Hualde: 1988) and (Avery-Rice: 1989)). These constraints will block the application of the assimilation rules when a disallowed configuration would result. The analysis via Configurational Constraints can prevent the appearance of non-coronal lateral/strident segments but it has no way of relating the lost of the pairs lateral-coronal and strident-coronal in gliding processes. In the following section we will deal with some data coming from Majorcan Catalan and Occitan to demonstrate that this alternative analysis has to be rejected.

3. Gliding Processes

If the presence of Coronal crucially depends on that of its subordinate features, Lateral and Strident, one would expect that if a rule removes Lateral or Strident from the representation, Coronal also will be lost and this is what we find. We will focus on two cases involving delinking of a dependent of Coronal and we will refer to them together as gliding processes, in relation to the result obtained (see Palmada(1991) for a more detailed analysis)

In Majorcan Catalan there is a rule delinking Strident in word final position when a consonant follows as illustrated in (16). Note however that the effects of this rule are visible only when the target is a palatal in (16a) and not when it is a plain strident as in (16b).

(16) a.

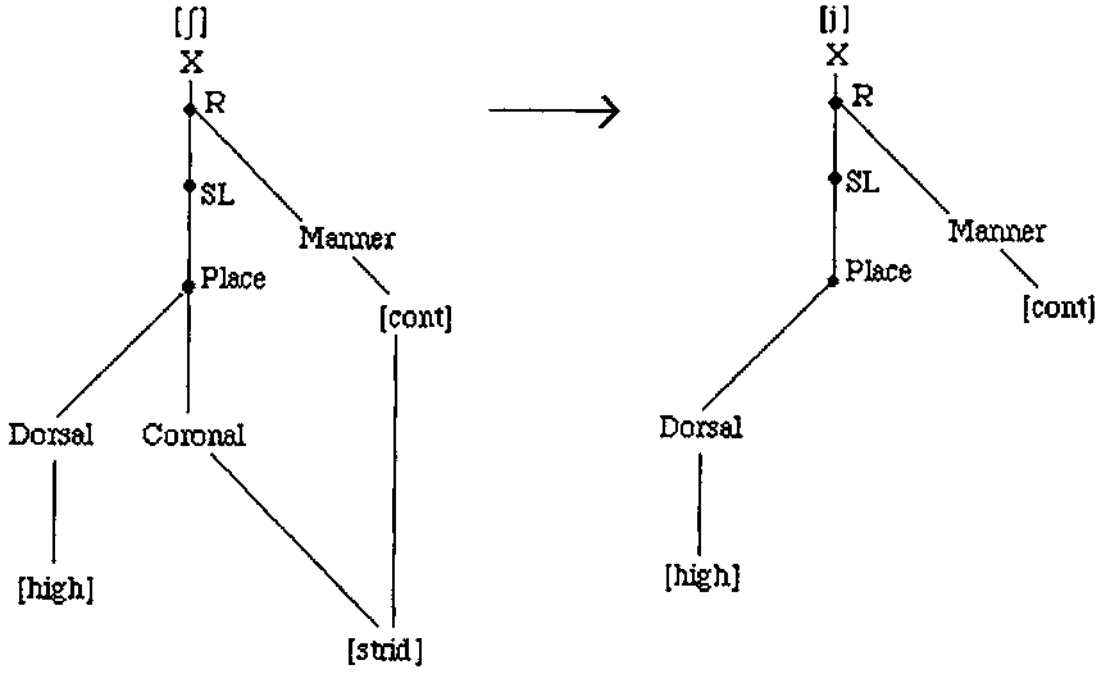
péʃ	'fish'	pejfɾít	'fried fish'
kəláʃ	'drawer'	kəlajgɾán	'big drawer'

(16) b.

més	'more'	mestɾɛ́ns	'more trains'
tɾɛ́s	'three'	tɾɛspáls	'three poles'

After delinking of Strident there is no justification for the presence of Coronal and it deletes because, as the unmarked articulator, it must be absent from underlying representations. The Secondary Articulator, i.e. Dorsal, becomes Primary and Strident cannot reassociate. If the affected strident is not a complex segment, the delinked feature can reassociate and this results in no change in the representations. The gliding process affecting a palatal strident is illustrated in (17).

(17)

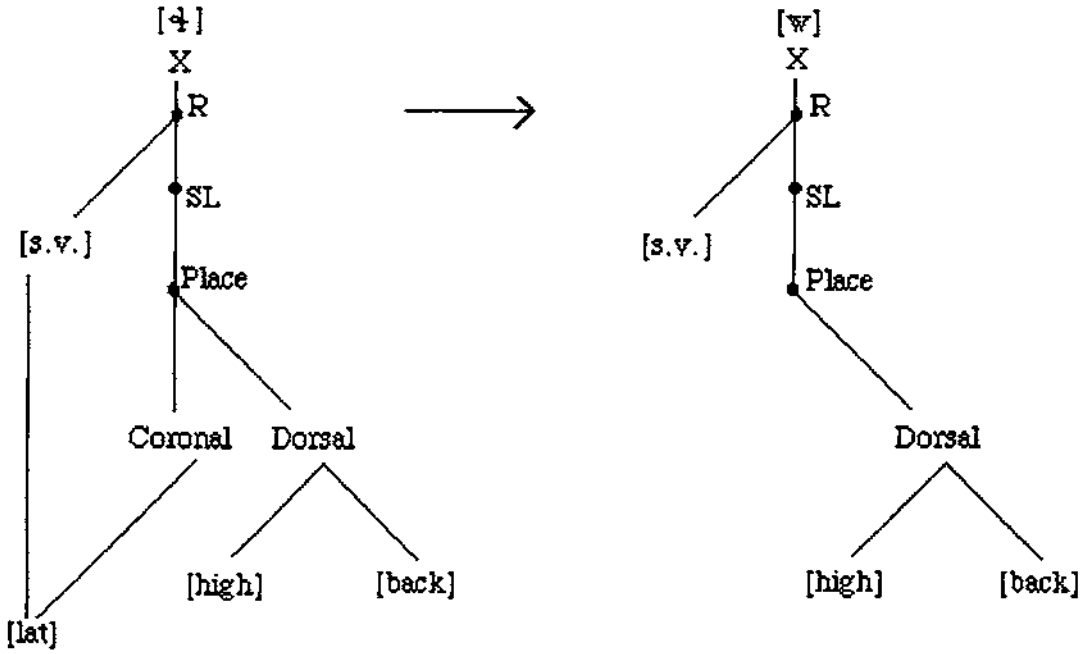


A parallel process of delateralisation in Occitan has been described by Sauzet (1982) as *labialisation.* As can be seen in (18) a lateral in syllable final position loses its coronal and lateral properties when it is followed by another consonant.

(18)	[vál]	'it costs'	[vowɾɔ́]	'it will cost'
	[kál]	'it is necessary'	[kowɾɔ́]	'it will be necessary'

The lateral in Occitan, as in Catalan, is a velar one and we represent them as complex segments with both Coronal and Dorsal articulators. The gliding process consists in an operation which delinks Lateral and the loss of Coronal is a consequence of it. In this way the remaining Dorsal articulator is interpreted as Primary, as represented in (19).

(21)



4. Conclusion

To summarize, we have accounted for asymmetries in the assimilatory behaviour of coronals by placing Lateral and Strident under Coronal. The observation of dialects which present centralisation of place prior to the assimilation forces us to recognise the double-dependency of these two features. Finally, we examine gliding processes affecting stridents and laterals to show that Configurational Constraints do not suffice and a solution based on Feature Geometry is required.

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