4. CONSONANTS: RESONANCE ELEMENT INTERACTION

4.1. Introduction

In this chapter we will consider certain distributional peculiarities concerning Munster Irish consonants. Specifically, we will concentrate on distributional effects in which the resonance elements 'I', 'U' and 'A' play a role. Recall that 'I' and 'U' define palatalised and velarised consonants. The question is if 'A' has any role to play in the segmental make-up of consonants. Traditionally within GP the vocalic elements 'I', 'U' and 'A' define palatality, labiality and pharyngeality of consonants (Harris (1990a), Williams and Brockhaus (1992)). The claim to be made in this chapter is that the element 'A' is found in coronal consonants (Broadbent (1991), Backley (1993), Scheer (1994, 1996).

In looking at phenomena connected with the participation of resonance elements in consonantal segments we will assume that these elements should exhibit the same effects and behaviour as in vowels. For instance, the vocalic system of Munster Irish shows that A-headed objects resist palatalisation. Thus, should there be an A-headed consonant, we would expect it to resist I-licensing. It will be demonstrated that the Irish facts support this assumption with a vengeance. Additionally, the headedness of resonance elements will be shown to play a crucial role in defining other consonantal properties such as, for example, friction. This fact corresponds to similar effects in vocalic systems, namely, narrowing or tenseness, and strengthens our claims concerning the affinity between the consonantal and vocalic systems.

This way of viewing phonological systems has a long history as linguists have increasingly found that certain phenomena and conditions should be generalised to both consonants and vowels. In Government Phonology, the first instance of such a realisation was probably an extension of the theory of charm, which was initially proposed for vowels, to consonantal objects (KLV (1985, 1990), Rennison (1987, 1990)). Additionally, it was assumed that the resonance elements 'I', 'U', 'A' and v^o define palatality, labiality, pharyngeality and velarity respectively where the contribution of 'I', 'U', 'A' and v^o to

consonants matches their acoustic signature in vowels.[1] The only cumbersome vocalic element for which no place was found in consonants was the ATR element (ꟻ$^{+}$) so that eventually it had to be abandoned. To a large extent, the "complexity condition" (Harris (1990a)), which was meant to replace charm in phonological representations follows the same pattern, namely, the complexity restrictions in vowels and consonants coincide.

More recently, headedness of phonological objects has received more attention in the analysis of vocalic systems (Cobb (1993), Charette (1994), Charette and Göksel (1994/96), Harris and Lindsey (1995), Ritter (1996)). Let us first see in what way the theory of headedness may influence the understanding of phonological representations as far as vocalic systems are concerned before returning to the question of the element 'A' in consonants. It is understandable that our assumption concerning the presence of 'A' in coronal consonants will involve a discussion on the representation of certain pertinent coronal segments such as [s] and [r]. We will first consider the current phonological standing of the neutral element, the so called "cold vowel", and introduce the notion of headedness in more detail. This will be followed by a discussion of [s] an [r] leading towards the proposal that the headedness of resonance elements may define the manner of articulation as well as place.

4.2. **Headedness in V's and C's**

It is impossible to begin the discussion of headedness without clarifying the phonological standing of the neutral element, which was initially referred to as the "cold vowel". It is defined as an object devoid of any salient property ('hot feature' in the sense of KLV (1985)) which behaves like an identity element. In vocalic objects, this element is assumed to appear whenever an active element is missing. Phonetically speaking the element defines a neutral vowel and corresponds to the centrality element in Dependency phonology (Lass (1984:278), Anderson and Ewen (1987:28n)) and to an empty segment in Particle phonology (Schane (1984:132)).

In GP, the neutral element (represented in the literature as /v^{o}/ or /@/) has been assumed to be present in the segmental make-up of both vocalic and consonantal objects. In

[1] Apart from the resonance elements consonants are defined also in terms of manner elements: ʔ -

vocalic objects the neutral element defines the baseline on which other resonances are superimposed (Harris (1994a:112), Harris and Lindsey (1995)). This allows for a neat and formal explanation of various vowel reduction phenomena as due to the suppression of active elements or to a switch in status whereby the latently present neutral element becomes promoted to the head position within a vocalic object (Harris (1994a)).

In consonants, the neutral element has been used to define velar consonants in which the 'cold' vowel has the status of the head. Thus /@/ may be understood as an independent element which defines the neutrality of vowels and the velarity of consonants.

More recently, /@/ has been assigned an even more prominent function in the GP treatment of vocalic objects as a result of eliminating the ATR element in that the contrast between ATR and non-ATR vowels is now expressed by the headship of either the active element or the neutral one (Harris and Lindsey (1995)).

(1)

ATR vowels		non-ATR vowels	
[I]	i	[I.@]	ɪ
[U]	u	[U.@]	ʊ
[A.I]	e	[A.I.@]	ɛ
[A.U]	o	[A.U.@]	ɔ

A slightly different view on the nature of the neutral element in what is basically an identical treatment of the ATR contrast is presented in Cobb (1993), Charette (1994) and Charette and Göksel (1994/96), in which the neutral element is excluded altogether from the phonological representation of vowels, and the ATR contrasts are expressed in terms of the headedness vs. headlessness of vocalic objects. Thus the active elements (I,U,A) are either headed or non-headed (empty-headed), with no special status assigned to the neutral element. This is illustrated below.

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stopness, h - noise, N - nasality, H - stiff vocal cords, L - slack vocal cords.

(2)

ATR vowels		non-ATR vowels	
[I]	i	[I._]	ɪ
[U]	u	[U._]	ʊ
[A.I]	e	[A.I._]	ɛ
[A.U]	o	[A.U._]	ɔ

(_) is used here only to show that the active elements are not headed. In this model, the ATR harmony consists merely in aligning the status of the resonance elements within a given domain (see e.g. Charette (1994)). Another consequence (if not advantage) of this approach is that the number of elements is yet again reduced which has an important influence on the number of possible phonological objects that the theory predicts, although, in this way, more prominence is given to headedness as an autonomous mechanism.[2]

The obvious logical step to be taken now is to exclude /@/ from the representation of consonants. One reason for this is the uniformity of the representations of consonants and vowels in terms of elements. Thus the earlier presence of /@/ as the head both in velar consonants and in the non-ATR vowels can now be captured in terms of its absence. The velar consonants are now represented as headless or empty-headed, i.e. none of the elements present in the segmental make-up of velar consonants forms the head. For example, the velar plosive [g] can be represented by just two elements in the operator position (h, ʔ, _).[3]

Thus the distinction HEADED vs. HEADLESS seems to gain more importance in representations. In the ensuing sections we will try to see to what extent the theory of headedness can be used in defining consonantal systems. One aim of this chapter is to show that headedness may define consonantal properties which have so far been restricted to

[2]It seems that both approaches to the neutral element are equally able to account for the empirical facts. The difference between them lies in the greater expressive power of the approach advocating /@/ as a separate element. For instance, the treatment of such processes as ATR harmony, which are now viewed in GP as head alignment (Charette (1994), Harris and Lindsey (1995)) can be also viewed as /@/ spreading if this element is recognised (Backley (1993)).

[3]The headless nature of velars naturally explains their propensity to lenition processes and may prove useful in accounting for the frequent neutralisation of the coronal / velar distinction under e.g. the influence of palatalisation, and the correlation between coronals and velars with respect to assibilation (Foley (1977:90)).

manner elements. The other objective is to see how the status of the resonance elements in consonants underlies element interaction. Recall that in vocalic systems only certain combinations of elements were possible.

Initially we will concentrate on the behaviour of resonance elements with respect to headedness. We begin with the controversial issue of the phonological representation of [s] and [r]. There are two reasons for this. Firstly, these segments recurrently exhibit their special status in consonantal systems. Secondly, if the assumption concerning the presence of the element 'A' in coronal consonants is correct then the interaction between coronal segments and palatalisation should exhibit similar phenomena to the A-I interaction found in the vocalic system discussed in chapters 2 and 3.

4.2.1. **[s] and the complexity question**

Typically, [s] used to be defined in terms of two elements (h^o, R^o) (e.g. Kaye (1992/96)), and being a charmless segment, it could not govern a complement even though it was more complex than other neutral segments.[4]

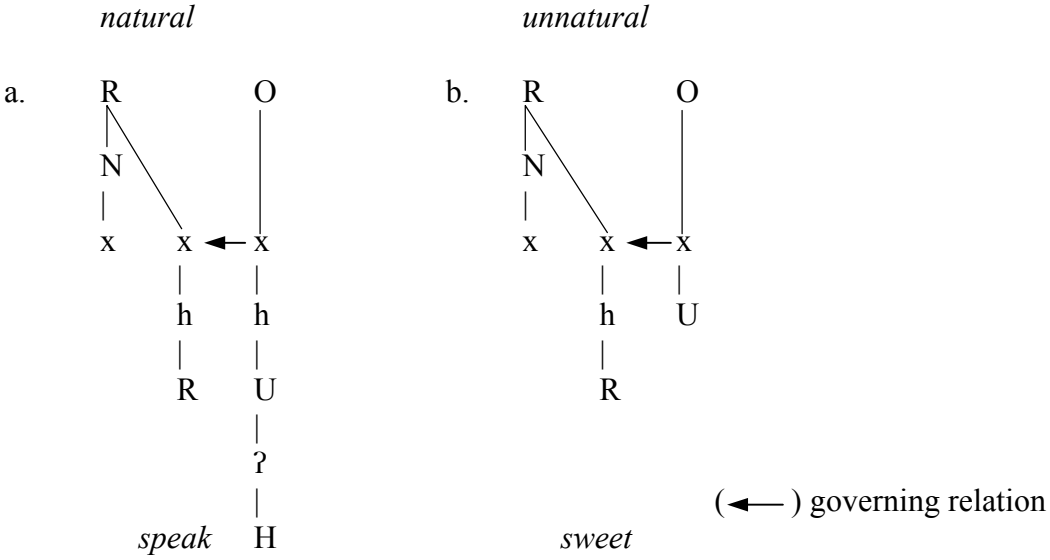
The theory of government predicts two situations where a non-nuclear segment governs a complement, namely, (a) within a branching onset, and (b) across constituents, where an onset governs the preceding rhymal complement (KLV (1990:218)), or the preceding onset (Kaye (1990:322)). The two types of relation are not symmetrical in that the interconstituent government allows more combinations, which is due to the fact that in this type of relation the head may be neutral. Thus, for instance, -rl-, -rn-, -rm-, -lm-, -ln- sequences are possible governing domains when the first segment belongs to the rhyme. The possibility of having such neutral sequences is accounted for by another criterion, viz. complexity of segments, which is calculated in terms of the number of operators occurring in the representation of these segments (KLV (1990), Harris (1990a)).

[4]See the introduction to GP (chapter 1.) for an exposition of the charm theory. Briefly, charm defines the governing properties of segments in that charmed consonants are governors and charmless ones are governees. Charm has now been replaced by complexity and we refer to it here strictly for the purpose of an adequate exposition of the ideas put forward in Kaye (1992/96).

Given that the complexity hierarchy of neutral segments is: {glides, r} < l < nasals (KLV (1990: 218)) we account for the absence of *-lr-, *-nr-, *-mr-, *-ml-, *-nl- sequences on the strength of the fact that the heads of such relations would be less complex than their complements. The segment [s] (R^o, h^o) is not mentioned in this context in KLV (1990). On the other hand, Kaye (1992/96) addresses the question of the governing properties of this segment with relation to (s+C) sequences.

Kaye shows that word-initial (s+C) sequences are not branching onsets but rather interconstituent relations where [s] is transconstituently governed by the following segment which may be charmed or neutral. In the latter instance the requirement is that the neutral governor should be more complex. On the basis of this requirement Kaye divides (s+C) clusters into two groups. To one group belong the so called "natural" transconstituent sequences *sp, st,* and *sk*, in which the obstruents are indisputably recognised as more complex than the complement [s], as well as being charmed. The other is represented by the "unnatural" sequences *sl, sr, sn, sm*, and especially *sw, sj*, where, despite the smaller or equal complexity of the second segment, [s] continues to be treated as a rhymal complement (a governee). Even with the relaxation of the complexity condition to allow equally complex segments to govern (Harris (1990a)), the problem of *sw* and *sj* remains. The structure of "natural" and "unnatural" (s+C) sequences is presented below.

(3)



Following this line of argument, and bearing in mind the structure of unnatural (s+C) sequences in particular, Backley (1993) redefines the representation of [s] as containing only

one element (h) with coronality left nonspecified. This results from the attempt to exclude the coronal element (R^o) from phonological representations, and also from the impossibility of replacing that element in the representation of [s] by any other element without running again into trouble with "unnatural" sequences as in *sweet*.

The question of the nonspecification of coronals aside, one notices that the need to represent [s] as a simplex consonant is forced upon us by the acceptance of ((3)b), i.e. a Rhyme-Onset relation, as the phonological structure of the "unnatural" sequences. Thus, assuming that it can be shown that the "unnatural" (s+C) sequences are not Rhyme-Onset governing domains, the requirement of a simplex representation for [s] might be relaxed. This is what we attempt to do in the following section.

4.2.2. **"Unnatural" (s+C) sequences in Irish**

The first argument against representing the "unnatural" sequences as (R-O) ((3)b) comes from the distribution facts in English. It seems that these sequences, i.e. *sl, sn, sw,* must always be followed by a vowel, which is not required for [sp], [sk] or [st], hence only the "natural" (s+C) sequences are found word-finally.[5] A similar type of restriction applies to the Irish distributional facts except that in Irish every word final *sl* is broken up by a vowel e.g. [uəsəl] *uasal* "noble". Additionally, Irish word initial (s+C) clusters behave differently with respect to lenition processes precisely depending on whether they are "natural" or "unnatural" sequences. In brief, it seems that "unnatural" sequences behave like two onsets rather than (R-O). First of all, it will be shown that in Irish *sl, sn, sr*, behave like a single *s* or as branching onsets and cannot be viewed as structurally identical with *sk, st, sp* and (sic!) *sm*.[6]

[5]Note that when *sl* is found word-finally, then [l] is "syllabic" e.g. [wisl] *whistle*. In this respect the behaviour of [l] is not in any way different from that in [botl] *bottle* in which we are definitely dealing with two separate onsets [t] and [l] as *[tl] is not a possible branching onset or an (R-O) domain for that matter.

[6]The comparison of the "unnatural" sequences to branching onsets does not mean that this is their structure. In fact the branching onsets themselves may need to be redefined as spurious clusters in Munster Irish, as they too survive mostly in word-initial position.

Let us see how the "natural" and "unnatural" sequences behave with reference to some basic processes in Irish. Irish word-initial consonants of feminine nouns in the nominative are lenited when the definite article *an* is added.[7] This applies no matter whether the first onset is branching or not.

(4)

[k´]	*cistin*	an [χ´]	*chistin*	"kitchen"
[b´]	*bean*	an [v´]	*bhean*	"woman"
[kr]	*cruacht*	an [χr]	*chruacht*	"hardness"
[pl´]	*pléasc*	an [fl´]	*phléasc*	"bang"

When the feminine noun begins with *s, sl, sr,* or *sn* the definite article prefixes *t-*, while the [s] is not realised phonetically.[8]

(5)

[ʃ]	*seilg*	an [t´]	*tseilg*	"hunt"
[sl]	*sláinte*	an [tl]	*tsláinte*	"health"
[sr]	*srón*	an [tr]	*tsrón*	"nose"
[sn]	*snáthaid*	an [tn]	*tsnáthaid*	"needle"

Following the possessive pronouns *mo* "my", *do* "your" and *a* "his", the [s] of the above forms is lenited to [h].

(6)

[sl]	*sláinte*	mo [hl]	*shláinte*	"my health"
[sr]	*srón*	mo [hr]	*shrón*	"my nose"
[sn]	*snáthaid*	mo [hn]	*shnáthaid*	"my needle"

t- is not prefixed to feminine nouns beginning with *sk, st, sp*, or *sm*, nor is the [s] lenited in this context.[9]

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[7]See Gussmann (1986) for an analysis of such forms within the autosegmental framework.

[8]Note that a single word-initial [s] (syllabified in the onset) behaves in an identical way to *sl, sr, sn* with respect to *"t-prefixation"* (e.g. *an* [t´] *tseilg* "hunt"), which supports our analysis.

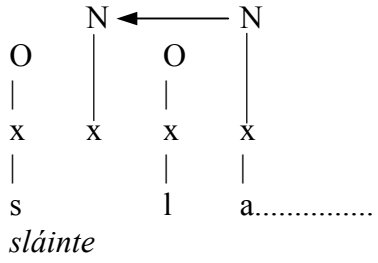
[9]Except Kerry, where we find [hmi:ni:s] *shmaoinís* "I thought" (Aidan Doyle (p.c.)).

(7)

[sk]	*scoil*	an [sk]	*scoil*	"school"
[sp´]	*spéir*	an [sp´]	*spéir*	"sky"
[ʃt´]	*stéig*	an [ʃt´]	*stéig*	"slice"
[sm]	*smaointeacht*	an [sm]	*smaointeacht*	"pensiveness"

Likewise, the [s] in these clusters is not lenited by the possessive pronouns e.g. [mo skol´] *mo scoil* "my school". It is striking that *sl, sr* and *sn* behave more like other branching onsets e.g. [kr] and not like rhyme-onset sequences e.g. [sk]. This is not to say that they are branching onsets but rather that they are not rhyme-onset sequences. In fact, it seems more appropriate to syllabify *sl, sr* and *sn* as a sequence of onsets.

(8)



sláinte

(◄—) Proper Government

In such cases, the second (realised) nucleus properly governs the empty nucleus, which word-initially, and in fact word-medially, is always the case. Word-finally, we predict that this sequence will be broken up due to the absence of a governor. Hence the alternation [uəsəl / uiʃl´ə] *uasal / uaisle* "noble/pl.". Thus the representation of the "unnatural" sequences accounts for their behaviour with respect to lenition processes as well as for their distribution, i.e. the fact that there are no word-final *sl, sn, sr* clusters.[10] This type of alternation, i.e. [uəsəl / uiʃl´ə] never occurs with *sk, sp* or *st* sequences, as they are legal in word-final position.[11]

[10]Since the distributional and lenition facts are identical for branching onsets and the "unnatural" (s+C) sequences one may propose that the alleged branching onsets also have the structure of a spurious cluster.

[11]It must be acknowledged that *sm* which behaves like *sk* with respect to lenition processes has a similar distributional restriction as e.g. *sl* in that it is not to be found word-finally. One consoling fact, however, is that *sm* does not seem to participate in alternations of the [uəsəl / uiʃl´ə] type, a peculiarity which suggest that the distribution of word-final *sm* is conditioned by other factors.

The source of the empty nucleus in ((8)) can be accounted for in a simple manner as following from a basic assumption in standard GP. Namely, two consonants are broken up by a nucleus if they cannot contract a governing relation. Given the fact that the differentiation of segments as regards charm, although now almost forgotten, has no role to play in *sl, sr* and *sn*, the reason why the sequence *sl, sr* or *sn* cannot form a governing domain of any kind may be due to the complexity criterion, which bars [l, r, n] from governing [s].[12]

This would mean that [s] is not simplex and may contain more than one element. The case of *sm* is particularly instructive here as the behaviour of [s] in this context seems to be parallel to its behaviour in *sk, sp* and *st* clusters. Given that [m] is more complex than [l, r, n] and that it can govern [s], this provides an indication of what kind of complexity we need to attribute to [s] in Irish in order for it not to be governable by [l, r, n] but to be readily governable by [m]. Such a distinction between [l, r, n] on the one hand, and [m] on the other, supports the importance of complexity in establishing governing domains over charm.

Irish [m] is different from other sonorants, and behaves like an obstruent in many respects. First of all, it is the only sonorant that undergoes lenition word-initially to become [v] e.g. [mɑ:hir´] / [ən vɑ:hir´] *máthair* / *an mháthair* "mother". Secondly, in word-initial *sm* cluster [m] behaves like other obstruents in that [s] is normally not lenited nor is *"t-"* prefixed to it.[13] However, distributionally [sm] does not appear word-finally like e.g. [sk].[14] Ó Siadhail (1989:113) notes that in certain subdialects of Munster the word-initial *sm* can be lenited to [hm] e.g. [hmut] *shmut* "stump" in which case *sm* patterns with *sl, sr* and *sn*.

Assuming that the structure proposed here for the "unnatural" s+C sequences is correct, we may now try do define the phonological representation of [s] in Irish bearing in

[12]These sequences cannot form branching onsets. This is due either to the homorganicity constraint operating in onsets (cf. e.g. *tl...), or to complexity. On the other hand, in Cyran (1996a) it is suggested that the palatalised version of [s] may govern [l, r, n] in interonset relations e.g. [si:l´ʃə] *soilse* "light/pl.", which, given that [ʃ] is more complex than [l´], corresponds to such interconstituents domains as e.g. *-rl-, -rn-, -rm-* etc.

[13]Additionally, the traditional process of vowel lengthening before "lengthening" sonorants occurs before [m] almost exceptionlessly (cf. section 3.2).

[14]Such a word-final governing domain is found in Polish *pasm* (Gussmann and Kaye (1993)), but it is not common. Word-medially, *sm* has to be [zm] in English (Kaye (1992/96)) which may be viewed as loss of (H) in order for [m] to govern the preceding spirant.

mind that it need not be simplex. First, let us consider if [s] indeed has to be viewed as exceptional phonologically.

4.2.3. **The special status of [s]**

The coronal fricative [s] has been assigned a special status among the class of fricatives mainly due to its exceptional behaviour. However, it seems that its special status may be derived from the primary "unmarked" status of coronals in general. Since coronals as a class behave differently from other major classes (see e.g. the papers in Paradis and Prunet (1991)), it is only natural to expect that a coronal spirant will also feature as exceptional within the class of spirants. The consequence of such a treatment of [s] is that it will be representationally viewed in the same way as other fricatives e.g. [f] or [χ]. Note that the distinction between the voiceless stops [p, k] and [t] is not due to the absence of the occlusion element (ʔ), or the tone element (H) in the coronal stop, but rather to the fact that coronal stops have a certain property which sets them apart.

If we accept this way of viewing the peculiar distribution of [s], then again one can derive it not from a special property of [s] but rather as an instantiation of the coronal property, whatever that is. For instance, [s] appears word-initially in consonantal clusters ([str..., sk..., sl...] etc.) while clusters like *[fk...], *[fpl...] *[ft...] or *[χkr...], *[χp...], *[χt...] seem to be illicit and constitute a good reason for [s] to be attributed special properties. Likewise, we do not get forms like *[kχ], *[pχ], *[tχ] or in fact *[tp], *[kp], *[tk] word-finally, but we do get [pt], [kt], just as we get [ks] and [ps]. Thus it is the status of coronals in general that needs to be understood better and not that of [s], as this segment exhibits similar properties to [t].[15]

The special property of coronals may be understood in various ways. The current understanding of this class suggests either underspecification of the coronal place of articulation (e.g. Avery and Rice (1989)), or, in GP, nonspecification of coronality (Backley

[15]What is intriguing in the distribution of coronal segments is not only the question of why [s] and [t] pattern in a similar way as opposed to [f], [χ] and [p], [k], but why, within the class of coronals, [s] and [t] behave differently from [l, r, n]. For instance, why are initial *[lp], *[rk], *[lkr], etc. impossible.

(1993), Harris (1994b)).[16] It seems, however, that we can revive the once abandoned attempt to define coronality by means of an active element and reach some interesting conclusions by means of it. Assuming that coronals *are* defined by the presence of some element, we should be able to derive the special status of coronals from the phonological behaviour of that element which, in its turn, should be justifiable on the basis of phenomena found elsewhere in the phonology. Such a possibility will be explored in this work.

Harris (1994b) discusses two basic methods of capturing the special status of a certain segment class and its recurrent phonological behaviour, viz. intrinsic and extrinsic accounts.

(9)

a.

Intrinsic: the special behaviour falls out directly from some design property of representation.

b.

Extrinsic: the special behaviour is induced by the operation of some device external to the representation (e.g. constraints, markedness conventions, linking conventions, fill-in rules, patch-up rules, sonority / strength hierarchies,...).

He proposes that one may only appeal to (b) as a last resort.

Thus our attempt to account for the special behaviour of coronals by means of an element will relentlessly place us in the "b-camp", unless we show that the special properties of that element are justifiable and able to capture all the variation involved in the behaviour of coronals (Avery and Rice (1989), Paradis and Prunet (1991), Hume (1994)).[17] Let us look at a recent proposal concerning the phonological representation of [s] and [r] which are directly relevant to our discussion of coronality as they represent segments of a reasonably simplex composition (as opposed to e.g. [t] which consists of a few elements (ʔ, H, h, R)) and therefore involve fewer parameters that need to be considered in order to arrive at their representation.

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[16]A clear illustration of the fundamental differences between underspecification and nonspecification in phonology is given in Harris (1994b).

[17]This will not be possible in this work. On the other hand, we point to certain possibilities for a future more in-depth study of coronal representation.

4.2.4. **An analysis of [s] and [r]**

Backley (1993) proposes the following representation for [s].

(10)

O
|
x
|
h

In this representation, coronality is nonspecified and [s] is assumed to contain only the noise element. Backley accounts for the lenition of [s] to [h] as a switch of status from an h-headed object (h) to a cold-headed one, i.e. (h, v^o). This lenition process need not be understood as the addition of an element (the neutral element), which would seem counter-intuitive, but rather a promotion of the latently present neutral element (v^o) to the head position, or a switch of status of (h) from headed to non-headed. Thus, in a framework which does not make use of the neutral element the opposition [s] / [h] can be expressed as (h) / (h._), i.e. a headed vs. non-headed noise element.

However, such a definition of [s] forces Backley to assume that the process of rhotacism by which [s] developed into [r] in certain languages, (e.g. Latin *auris*, OE *ēare* (Mod. Eng. *ear*) but Gothic *auso*, Polish and Russian *ucho*)[18] must be treated as h-loss which produces the representation of [r] as (v^o), i.e. realisation of an empty position.

(11)

O
|
x

Backley proposes then that r-sounds are language specific phonetic interpretations of an empty non-nuclear position, which is parallel to realisations of empty nuclei (hence the variety in r-sounds in different languages), and assumes that the realisation or non-realisation of the non-nuclear position is controlled by parameterised Proper Government.[19] However,

[18]Andersen (1968) IE **s* after *i, u, r, k* in Baltic and Slavic.

[19]Charette (1991) claims that empty onsets are properly governed by the following nucleus (see also the discussion of compensatory lengthening in Irish (3.4.3)).

the only possible example of an operation of such a parameter given by Backley is that of Haitian French Creole where in word-initial position [r] is realised in almost all *h-aspiré* words. This, according, to Backley is due to the parameter being set in the OFF. The following data are quoted by Backley from Tinelli (1981).

(12)

[raše]	*hacher*
[rele]	*héle*
[ro]	*haut*
[raji]	*had'r*

Despite the assertion that [r] cannot be explained by the spreading of any element from the nucleus Backley does not quote forms in which [r] would be followed by [i] or [u]. In this way, he does not exclude a possible candidate for such spreading, namely, the element 'A' which is present in all the vowels quoted above.

The presence of 'A' in [r] notwithstanding, this analysis runs into other formal problems connected with the *Empty Category Principle* (ECP). According to Charette (1991) an empty onset is properly governed by its nucleus since the two are in a licensing relation.[20] This nucleus must be realised, which is the case in the forms above. However, if r-sounds are to be viewed as unlicensed non-nuclear positions a few problems have to be addressed and accounted for.

One of the difficulties that immediately springs to mind is how to account for the situation, typical of most languages, where words begin both in a vowel and in [r] e.g. English *reel* and *eel*. Do we want to claim that certain vowels properly govern the empty onset position while others do not? Admittedly, one way out would be to propose that in *eel* the initial onset is positionless, therefore it is not realised as [r], but would this not be an arbitrary claim about the representation of *eel*? Additionally, a question arises as to how we would distinguish between word-initial Proper Government (PG) and word-medial PG to account for languages which phonetically begin with a vowel but have r-sounds word-medially? Likewise, one might ask if there is a language which would have only word-final

[20]Kaye (1990) proposes that interonset geminates also involve a relation of Proper Government. See also Bloch-Rozmej (1994) for a similar analysis of Irish geminates.

[r]'s, which would be realised due to the fact that they are followed by the empty domain final nucleus and cannot be properly governed?

It seems that what we witness is in fact the reverse situation, that is to say, [r] sounds need licensing from phonetically expressed nuclei in order to be pronounced. Consider non-rhotic English for example, in which, the [r] which is not licensed by an expressed nucleus is not realised, be it word-finally or in the "coda" position of consonantal clusters. Since empty nuclei are not proper governors, Backely's analysis should produce contradictory results in English. For example, such empty onsets should obey the same principles and conditions as nuclear empty positions, i.e. the *Empty Category Principle* and *Proper Government*, which state that an empty position must be realised if it is not properly governed. Thus, in English we would expect that every word-final [r] would be realised because there is no governor to properly govern the position. On the other hand, every intervocalic [r], including "linking" and "intrusive" [r]'s in English, should never appear as they are directly followed by an expressed nucleus which should properly govern the empty onset position.[21]

The last problem connected with Backley's proposal is connected with the distribution of r-sounds and word-medial empty non-nuclear positions. It does not predict the occurrence of r-sounds in the 'coda' position, e.g. Polish *park* "park", or Irish *beirt* "two people", i.e. when they are directly followed by an onset. Recall that an empty non-nuclear position followed by an onset forms the structure of a geminate (KLV 1990:217), which is characterised by the relation of Proper Government between the onset and its rhymal complement. The same applies to interonset geminates (Kaye (1990:322), Bloch-Rozmej (1994)).[22]

The above objections are not aimed to demonstrate that Backley's proposal is fundamentally wrong, but rather, they point to a number of aspects of the present state of the GP model with which it is not entirely compatible.

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[21]The last objection may be refuted if we give a different analysis of [r] sounds. This is the proposal of Harris (1994a:259) where [r]'s are analysed as part of nuclei. Nonetheless, Harris's analysis differs from that of Backley's in that the element R is still employed, and what is most important, the analysis is partly dependent on the clear distinction between R and v^o. Thus, even if we eliminate R from the representation of [r], some other element is still required.

[22]Certain onsets may not be able to properly govern their complement. This, however, does not seem to result in (r+C) sequences, but rather in compensatory lengthening of the preceding vowel (cf. such cases of compensatory lengthening in Irish (3.2)).

However, on the basis of these arguments it seems prudent to reconsider the possibility of representing r-sounds by the presence of *some* element. Broadbent (1991) suggests that 'A' be used for this purpose. Notice that the data from Haitian French Creole can be accounted for by regarding them as the spreading of this element from the nucleus if indeed no cases of [r] in place of *h-aspiré* are found before [i] and [u]. Additionally, the so called hiatus-breaking consonants in English can be given a straightforward account if the intrusive [r] is not treated as different from intrusive [y] or [w] glides in the data below (taken from Harris (1994b)), but rather as a realisation of the third element, the presence of which is obvious.

(13)

'I'	'U'	'A'
see[y]ing	woo[w]ing	bar[r]ing
say[y]ing	go[w]ing	saw[r]ing

In the following section we will consider the facts about r-sounds in Irish. There are reasons to believe that these sounds contain the element 'A'. Broadbent (1991) proposes that we treat the "linking" and "intrusive" [r] in English as A-glides, i.e. a realisation of the element 'A' in a non-nuclear position (see also Backley (1993)). It will be shown that the effects of palatalisation of r-sounds in Irish may be better understood if they are represented as 'A', in which case the effects of A-I interaction should resemble the situation encountered in vocalic transitions, and may be accounted for in a similar fashion. The next step will be to investigate the possibility that [s] also contains 'A'.

4.2.5. **The element 'A' in Irish r-sounds**

The distribution of r-sounds in Irish is puzzling. First of all, it seems that word-initially [r] may not be palatalised (Henebry (1898:74), Sommerfelt (1927:214), Sjoestedt (1931:46), Ó Cuív (1975:49)). It is difficult to assert whether the word-initial [r] is in fact velarised either.[23] Recall the behaviour of initial [r] in the monosyllabic forms [ri] and [ru] (2.3.6)

[23]de Bhaldraithe (1945:42), in his description of the Cois Fhairrge dialect, acknowledges that word-initial [r] has the resonance of a half-open retracted ə-vowel when followed by a front vowel. Otherwise, it has an 'u-resonance' which is typical of velarised consonants. This may mean that the word-initial [r]

which are variants of the word for "running" *rith*. Given the Onset-Nucleus dependencies of such forms, discussed earlier, the variants clearly indicate that the elements defining palatalisation or velarisation are not licensed in the onset position, but still influence the nucleus.

Let us concentrate on the question of the absence of palatalisation in initial [r] despite the effects which point to the presence of the element 'I' (cf. e.g. [ri] *rith*). In phonetic descriptions of Munster sub-dialects it has been noticed that the manner of articulation of r-sounds differs depending not only on the quality but also on the position within the word. The r-sounds are realised in two different ways, namely, as a voiced fricative trill or as a voiced flapped consonant. There are palatalised and velarised versions of the two realisations. However, the distribution of the two qualities does not correspond to the manner of articulation. Thus, the non-palatalised [r] is pronounced as a fricative trill only in absolute initial position as in [ri:] *rí* "king" or [ru:n] *rún* "secret" and as a single (or double) alveolar flap in other positions, i.e. between vowels, word-finally, following consonants and preceding consonants. On the other hand, the palatalised r-fricative occurs between vowels and word-finally, and the palatalised alveolar flap is found in the context following or preceding a consonant.

For the sake of the argument let us concentrate on the most clear situation, i.e. the word-initial, intervocalic and word-final contexts. The distribution, of r-sounds in these contexts seems to be complementary. This is represented in the table below (based on Ó Cuív 1975:49).

(14)

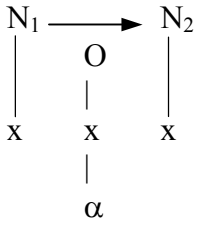
word-initial	intervocalic	word-final
r - spirant	ɾ - flap	ɾ - flap
*r´	r´- spirant	r´ - spirant

One can propose the following interpretation of the facts presented in ((14)). Given the distribution of the velarised type of r-sounds it may be assumed that the alveolar flap is a

resists both palatalisation and velarisation. A similar assertion is made in the description of East Perthshire Gaelic (Ó Murchú 1989:104)

weakened form of the word-initial spirant (trill). This claim is supported by the phonetic realisation of non-initial [r]'s, as well as the phonological fact that the weakened member occurs in the context which has widely been recognised as a prime site for lenition or reduction (Harris and Kaye (1990), Harris (1990a)), represented below.

(15)



We have seen in the case of nuclear fusion in verbal forms, e.g. [sig´ / si:m´] *suigh / suím* "sit / I sit" (3.4.2), that this context is indeed operative in Irish phonology.[24] The reduction context illustrated in ((15)) unifies the intervocalic and word-final position of the weakened r-sound. Recall that word-final consonants are always syllabified in the onset position and are followed by an inaudible nucleus (Kaye (1990)). The reduction of the intervening onset may be viewed in a metaphorical way as a weakening of a possible "barrier" to the internuclear relation (Harris and Kaye (1990)), or as the result of the diminished segmental licensing power of N_2 which itself is governed (Harris (1990a, 1992, 1994a).[25]

An independent argument for the proposed weakening of intervocalic [r] and its subsequent susceptibility to palatalisation and velarisation is provided by sandhi effects in which word-initial [r] may be palatalised if it finds itself in an intervocalic context. For example, in [ri:] *rí* "king" the initial r-sound is unaffected by palatalisation. However, in the vocative form [ə r´i:] *a rí !*, when [r] finds itself sandwiched between two nuclei, the consonant is palatalised (Sjoestedt (1931:46), Cyran (1996b)).[26] That is, the element 'I' may now be licensed within the onset

[24]The direction of Irish internuclear relations seems to be from right to left. Nonetheless, the diagram demonstrates the original proposal of Harris and Kaye (1990).

[25]The distinction between N_2 being licensed word-finally (by parameter), and the situation in which this nucleus has melodic content does not play any role here, although it can be crucial in cases in which word-final weakening effects differ from word-medial ones (see Harris (1990a:284) and also 3.4.3).

[26]See also consonant delinking in verbal forms in an internuclear context (3.4.2).

The question is how to connect the fact that only weakened [r] can be palatalised or velarised and the proposal that the r-sound in (Munster) Irish contains the element 'A'. Recall that headed 'A' is not affected by palatalisation in the vocalic system, e.g. [bɑn´ə] *bainne* "milk", while the empty-headed 'A' of [sop / sip´] is. Recall also the only case of regular [ɑ / i] alternations of the type [tə'sɑχ / 'tosig´] *tosach / tosaigh* "beginning/gs.", which may be understood as palatalisation of a "weakened" A-vowel.[27] It seems that these facts can be correlated with what is happening to Irish [r].

Let us assume that 'A' is the only element present in the representation of [r] and that in the spirantised (trilled) version this element forms the head. Consequently, the weakened type of [r] contains 'A' which is not licensed as the head, but rather as an operator.[28] The two types of segments are presented below.

(16)

a. *trilled* [r] b. *flapped* [ɾ][29]

The distribution of these segments is presented in the table above. It seems that now we are in a position to account for the lack of palatalisation of the headed [r], as its behaviour clearly corresponds to the situation encountered in the vocalic transitions in which the element 'I' could only affect nuclei which were not 'A'-headed. Hence, the lack of vocalic transition in [kɑt / kɑt´] *cat / cait* "cat/gs." and the resistance of the word-initial trilled [r] to palatalisation may have the same cause.[30]

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[27]This is a simplified and possibly wrong interpretation of the [ɑ / i] alternation (see Gussmann (1994)). A still different analysis is tentatively proposed later.

[28]This type of weakening, i.e. switch of status, is well established in Government Phonology and has been used to account for various raising and reduction phenomena that affect vowels in recessive positions (see Harris (1994a:112) and Harris and Lindsey (1995)).

[29]See Broadbent (1991), and Backley (1993) for a proposal of a similar structure for English.

[30]It is obvious that the formulation invoking headedness of opaque segments may be insufficient, or too general. Clearly the trilled [r] is not the only headed consonant in Irish and other consonants are affected

The next question which must be taken up here is the effect of palatalisation and velarisation on the "weak" r-sound. As opposed to the word-initial situation, in which we can assume, following the comment made by de Bhaldraithe (footnote (23)), that neither 'I' nor 'U' may be licensed in the onset, the two elements are present in the segmental make-up of the reduced reflex. This is proved by the presence of the u- and i-resonance of the velarised and the palatalised types respectively. However, the effect of velarisation is different than that of palatalisation. The palatalised reflex of the reduced r-sound is again a fricative trill, i.e. a strong consonant, while the velarised reflex remains a mere flap with u-quality. This peculiarity can be accounted for by invoking the correspondence of this phenomenon to the way in which the elements 'I' and 'U' affect short nuclei.

As we argued in previous chapters, the element 'I' is licensed in the affected vocalic object as the head, whereas 'U' becomes the operator. If the effect of palatalisation of headless consonants is the same, then we will be able to answer the question why the palatalised reflex of r-sounds is strong, i.e. a fricative rather than a flap. The following interpretation might be proposed. Palatalisation can affect r-sounds which are not A-headed, in which case the element 'I' becomes the head of the affected expression, as it does in vowels. Therefore the palatalised reflex is headed, i.e. strong and phonetically realised as a spirant. This is illustrated below.

(17)

a. *velarised flap*

b. *palatalised trill*[31]

The velarised weak r-sound does not become a headed expression because the element 'U' does not become the head of the affected expression.[32] Recall that in the vocalic system the

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by palatalisation. One conclusion that could be drawn from this is that it is rather a matter of the interaction between elements 'I' and A-head than between 'I' and headed segments in general.

[31]A similar proposal is made in Scheer (1994) to represent the palatalised trill in Czech.

[32]This agrees with what we found about U-spreading in vocalic alternations. See also Ó Baoill (1979) who presents a formant chart which clearly indicates that [L], [N] and [R] in East Gweedore (Donegal

effects of 'U'-spreading were less spectacular than those of 'I'-spreading. One palpable result of the asymmetry between 'I' and 'U' spreading is the fact that the A-headed nucleus is realised as [e] between two palatalised onsets, but no obvious raising to [o] is observable between two velarised ones (if the nucleus is A-headed). Thus, the mechanism of both 'U' and 'I' spreading is that they both affect empty-headed nuclei (and consonants), but in different ways. One problem connected with this analysis involves the interaction of 'A' and 'I' in palatalised r-sounds. If our analysis of vocalic alternations is correct we should expect A-suppression. Such an outcome is undesirable as it would yield a semivowel [j] due to the Munster parameter "*I does not license operators*".[33]

One way out would be to abandon the parameter, or to speculate whether something else does not license the element 'A' in [r´]. Below we will look at one context in which the element 'A' seems to be licensed externally, a phenomenon resembling the A-support discussed in vocalic transitions. On the other hand, in later sections it will be proposed that 'A' and 'I' may be present in consonants without fusing, which might account for affrication and the assibilation of coronals (4.4).

4.2.6. **Irish [r] in homorganic contexts**

Apart from the word-initial position, Irish [r] resists palatalisation in the context in which it is followed by a homorganic consonant. First let us look at the way [r] behaves in nonhomorganic clusters.

(18)

[korp / kir´p´]	*corp / coirp*	"body/gs."
[k´ark / k´ir´k´ə]	*cearc / circe*	"hen/gs."

Irish) have the acoustic characteristics of a vowel [o:], which in our terms entails the presence of the elements 'A' and 'U'.

[33]Notice that this problem does not arise in e.g. Connemara Irish in which [o / e] alternations (Munster [o / i]) indicate that 'I' and 'A' may combine to form an I-headed compound expression (A.I).

In this context, as well as in branching onsets e.g. [bʹrʹaː] *breá* "fine", the palatalised variety of [r] is not pronounced as a trill but, similarly to intervocalic velarised [r], as a single flap. Let us now observe the behaviour of [r] in the context when it is followed by a homorganic consonant.

(19)

a.	[bʹertʹ]	*beirt*	"two people"
	[fʹrʹagərtʹ]	*freagairt*	"answering"
	[laurtʹ]	*labhairt*	"speaking"
	[sɑgərtʹ]	*sagairt*	"priest-gs."
b.	[buːrdʹ]	*boird*	"table-gs."
	[ɑːrdʹ]	*aird*	"height-gs."

The forms are limited to [...rtʹ] and [...rdʹ] only, as instances of *[...rʃ] and *[...rnʹ] are always broken up by an intervening vowel unless the sequence is followed by a realised nucleus (see ((20)) below). Additionally, the cluster [rd] usually causes lengthening of the preceding stressed vowel (e.g. [ɑːrd] *ard* "height").

Let us look at a different set of data illustrating the same phenomenon of resistance of [r] to palatalisation when immediately followed by a homorganic consonant. This time also [..rʃ..] and [..rnʹ..] are involved. However, as opposed to the data in ((19)), we can be sure that the surface homorganic sequence in the plural contains a licensed nucleus. Note that when this nucleus is realised in the genitive, then the r-sound is palatalised.

(20)

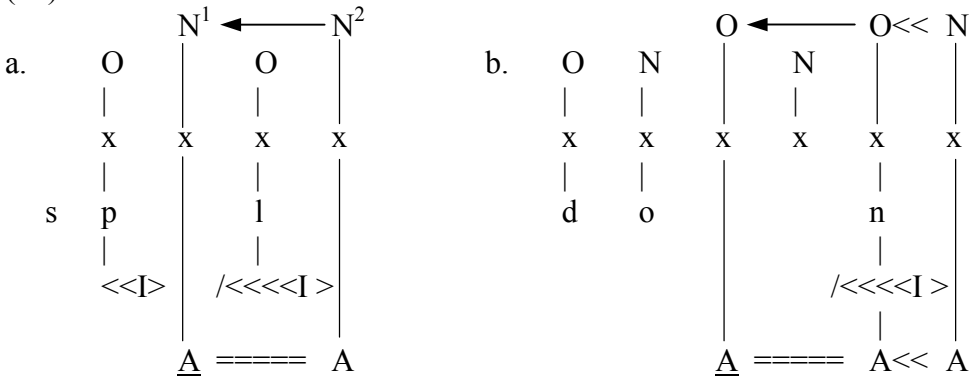
	NOM.	GEN.	PL.		
a.	[soləs]	[selʹiʃ]	[siːlʹʃə]	*solas / solais / soilse*	"light"
	[mʹilʹiʃ]	[mʹilʹiʃ]	[mʹiːlʹʃə]	*milis / milis / milse*	"sweet"
b.	[dorən]	[dirʹinʹ]	[doːrnʹə]	*dorn / doirn / doirne*	"fist"
	[dorəs]	[dirʹiʃ]	[doːrʃə]	*doras / dorais / doirse*	"door"
	[kɑrə]	[kɑrəd]	[kɑːrdʹə]	*cara / carad / cairde*	"friend"

The data in ((20)a) and ((20)b) differ in that in the genitive and the plural forms of ((20)a), [l] is palatalised both in the intervocalic position ([m´il´iʃ]) and in the context when the following nucleus is licensed ([m´i:l´ʃə]), while [r] in ((20)b) can only be palatalised in intervocalic position. The existence of palatalised [r] word-finally e.g. [kir´] (/kir´ɸ/) *cuir* "put" clearly suggests that it is not the empty nucleus in [do:rn´ə] (/do:røn´ə/) that is responsible for the lack of palatalisation spreading (cf. also [si:l´ʃə] (/si:l´ɸʃə/) in which the empty nucleus does not block spreading), but rather the following (homorganic) consonant.

The data in ((20)) above exhibit a number of phenomena. Let us disregard vowel lengthening and concentrate only on the vowel - zero alternations which are best analysed not as effects of Proper Government but rather in terms of interonset government (Cyran (1996a)), in which [r] is licensed (governed) by the following homorganic onset (see ((21)b) below).

Assuming that all coronal segments, which used to be defined by the element R, in fact contain the element 'A', then parallel to A-support in the vocalic system (2.3.3), the A-bridge might account for the licensing of the element 'A' as the HEAD of [r] which renders it immune to palatalisation spreading, as in word-initial position. The two situations are supplied below.[34]

(21)



[sp´el´ə] *speile* "scythe-gs." [do:rn´ə] *doirne* "fist-pl."

Recall that the vowel [e] in [sp´el´ə] was treated as a phonetic effect rather than a combination of 'I' and 'A'. The reason for this was the fact that 'A' in N^1 ((21)a), being a head,

[34]The structure illustrating the interonset relation is simplified and contains only the information which is relevant to this discussion. Thus, lengthening of the stressed nucleus is not represented or explained (see Cyran (1996a)).

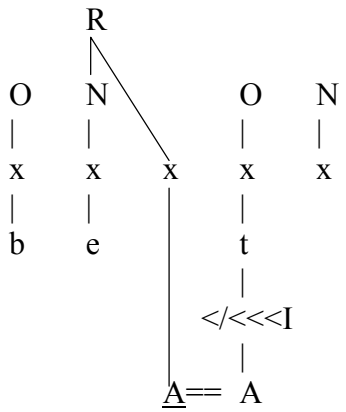
could not be fused with the incoming 'I'. Thus, once the element 'A' is supported as the head of [r] due to interonset government it is not affected by palatalisation ((21)b).

This analysis demonstrates the correctness of the proposal that Irish [r] should contain the element 'A'. Additionally, the facts discussed above provide supporting evidence in favour of the assumption that the interaction between resonance elements should produce comparable phenomena in vocalic and consonantal systems. However, the comparisons can be made only once we have established the correct representations and identified the constraints which underlie the interaction.

Admittedly, some degree of discrepancy in the phonological behaviour of vocalic and consonantal systems must be expected. For example, one might expect that in our analysis in ((21)b) the r-sound, being supported as the head, should correspond to its realisation in word-initial position, i.e. as a trill. This does not happen, and a flap is heard. Notice however, that the palatalised version of [r] which is fricative intervocalically is also reduced to a single flap in branching onsets ([b´r´a:]) and rhyme-onset ([k´ir´k´ə]) contexts. Note also that in both cases the [r´] acts as a complement, i.e. it is governed by another consonant. This fact could explain the phonetic realisation of [r] as a flap in [do:rn´ə] ((21)b). Here, this consonant acts as a complement of a governing relation between onsets.[35]

As to forms like [b´ert´] *beirt* "two people", where interonset government has not been observed, it seems that a similar analysis can still be applied as the final consonants are in a governing relation, though of a different type.

(22)



[35]One may ask the question as to why [l´] in [si:l´ʃə] ((20)a) is palatalised, given that we expect a similar A-bridge. One possible explanation might be that [l´] does not contain 'A' and is represented as, e.g. (U, I, ?).

Here too, the [r] is supported by a homorganic consonant and hence not palatalised. From the formal point of view, there is not much difference between an interonset relation and the ordinary Rhyme-Onset governing domain presented above. In both cases the governee is licensed by the head of domain, i.e. the following onset. Recall that in [spˊelˊə] ((21)a), the support is also government driven. It also appears that the phenomenon of A-support is directional. This could explain the absence of this effect in branching onsets headed by a coronal obstruent, namely, the [r] in homorganic onsets is still palatalised e.g. [tˊrˊiː] *trí* "three".

Another problem that this analysis evokes is connected with the way other consonants are affected by palatalisation and indeed velarisation. One prediction that follows from the analysis of r-sounds is that other non-headed consonants should become 'I'-headed when palatalised.[36] This to some extent is what happens. The obvious group to consider in this context would be velar consonants because the head of these consonants is the "cold" vowel which, if it is treated in consonants the same way as in vowels, means that the consonants will be empty-headed or headless (cf. the discussion of the "cold" vowel in vowels and consonants (4.2)). However, let us first try to provide a tentative definition of the Irish [s] in terms of elements.

4.2.7. **The segmental make-up of the Irish [s]**

Government Phonology, like any other theory, strives to capture both the sets of segmental oppositions which characterise any phonological system and also the natural grouping into which sounds are organised according to their participation in phonological processes. Bearing in mind that [s] should be treated as phonologically more complex than [r], the latter being composed of at least the 'A' element, we have three choices for the representation of that consonant ((23)). The larger number of elements in [s] enables us to account for the

[36]One could view the palatalisation of [s] to [ʃ] as an instantiation of this prediction, in that the palatalised version of [s] appears to be I-headed. There are claims however, that resonance elements cannot be heads in compounds involving the presence of manner elements (Chalfont (1995), Ingleby, Brockhaus and Chalfont (ms.)).

historical process of rhotacism (e.g. *honos* > Classical Latin *honor*) as decomposition or weakening of [s] so that all other elements are delinked except 'A'. Thus the presence of 'A' in [s] follows from its presence in [r]. Consider the three possibilities below.

(23)

a. [s] = (H.h.A) (where H stands for high tone)[37]

b. [s] = (H.A)

c. [s] = (h.A)

The representation of [s] involving the maximal choice, i.e. the three elements (H.h.A) can be described in the following way. 'H' (high tone) accounts for the voiceless nature of [s], 'h' (noise element) defines friction, while 'A' represents coronality. Below, we will consider the possibility that either 'H' or 'h' is superfluous in the representation of [s] and other Irish voiceless spirants (i.e. [f, ʃ, χ, h]). In order to see which representation of [s] is accurate we need to look at part of the phonology of Irish where this segment reveals its contents.

One area which needs to be investigated is the system of phonological oppositions. Let us first consider briefly the phonological standing of the elements 'H' and 'h' in Irish. We begin with 'H', i.e. the tone element which normally defines the voicelessness of consonants. It has a counterpart, i.e. 'L' (low tone), which is used in fully voiced consonants (Harris (1990a:264)). The voicing contrast must be specified in the group of Irish plosives. Sjoestedt (1931:8) provides the following contrastive pairs.

(24)

[pɑkə]	*paca*	"pack"	[bɑkə]	*bacadh*	"hindrance"
[tɑ:]	*tá*	"is"	[dɑ:]	*dá*	"if"
[kɑ:]	*cá*	"where"	[gɑ:]	*gá*	"need"

Let us assume that the contrast is represented by the presence versus absence of the element 'H', i.e. the voiceless plosives contain 'H', while the voiced ones do not contain the laryngeal

[37]Under the assumptions of the charm theory such a representation would be impossible as [s] was viewed as charmless. However, following the assumption that [s] differs from other fricatives only due to its identity as a coronal segment (a class which itself entails specific behaviour), the presence of the tone element should not come as a surprise given that other voiceless fricatives have it and that it plays some role in defining existing phonological contrasts in a given language.

element. There are a few reasons for that choice. First of all, phonetically speaking, Irish voiced plosives are fully voiced only in word-medial context, i.e. intervocalically. Otherwise, they are partially devoiced (Ó Cuív (1975:31)). Secondly, the voiced plosives come across as weaker than their voiceless counterparts which may be due to the smaller number of elements in their representation. This weaker status of voiced plosives manifests itself in, for instance, the process of compensatory lengthening discussed in the previous chapters e.g. [sig´ / si:m´] *suigh / suím* "sit / I sit".[38]

On the other hand, it seems that the voice contrasts among Irish fricatives are of lesser importance. In fact, one can practically assert that there is almost no contrast to speak of. For instance, [s] has no regular voiced counterpart [z]. Likewise, [ʃ/ʒ] pairs are virtually non-existent in the system, where similarly to [s/z] only the voiceless object is present as the palatalised version of [s].

Some contrast may be perceived in the distribution of [f] and [v]. However, unlike [f], [v] does not seem to be an independent phonological unit in that word-initially only [f] appears independently, while [v] is either the result of morpho-phonological alternations like the lenition of [b] or [m], e.g. [ən v´an] *an bhean* "woman", [ən vɑ:hir´] *an mháthair* "mother", or the eclipsis of initial [f] e.g. [ən v^{w}il´ tu:...] *an bhfuil tú...* "are you...". Word-medially, [v] tends to be lost e.g. ['gr´anəvər / gr´a'nu:r] *greanmhar* "funny", while word-finally [v] is found but [f] is virtually non-existent in native words. Similar restrictions apply to [χ] and [ɣ] in that both result from lenition. However, [χ] has a wider distribution than [ɣ] as the latter appears only word-initially.

Thus, in the case of fricatives we may speak of independent voiceless objects only. In this light it may seem superfluous to mark them by the presence of the element 'H' as it would have no function in defining phonological contrasts. This in turn suggests that the representation of [s] is (h.A). Likewise, [f] and [χ] would be defined as (h.U) and (h._) respectively. This representation assumes that, unlike in plosives, the absence of 'H' still renders the objects voiceless. A similar assumption is made in Backley's proposal (4.2.4) where [s] is defined as 'h' alone. One may wonder, however, if such a stipulation is not arbitrary.

[38]Recall the derivation of long [i:] and [u:] (3.4.2) in which, [v´] and [v] (voiced labial fricatives!) are delinked on a par with [g´].

Let us now consider an alternative proposal which, it seems, captures the same facts about fricatives and makes their representation uniform with that of plosives. We may propose that it is the noise component ('h') that is superfluous in the phonological representation of Irish spirants and maybe in the whole consonantal system of the language.

4.2.8. **Is "noise" a category in Irish?**

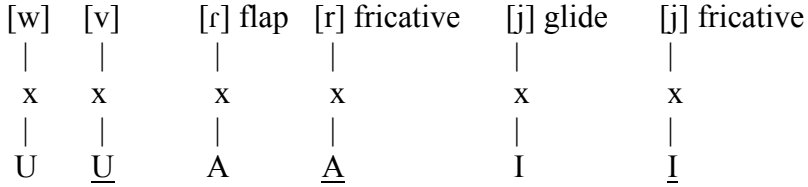
To begin, let us again articulate the questions which are pertinent to the issue of Irish fricatives. Namely, why should it be the case that in general voiceless consonants have a wider distribution than voiced ones, and why is it that a wider distributional gap concerning the voice distinction is found in the class of fricatives rather than among plosives? The last point may appear paradoxical, however, as will be shown below, the distinction plosive / spirant, if understood in terms of element complexity, may quite logically account for the distributional facts in both classes.

Now let us turn to arguments against the presence of 'h' in Irish fricatives. For this, we need to look at the relation between voiced fricatives and glides. It was mentioned in 3.4.2 that the fricative [v] and the glide [w] are not contrastive in Irish. For instance, the afore mentioned example [ən v^{w}il´ tu:] *an bhuil tú...* "are you..." may have a variant pronunciation [ən wil´ tu:]. Similarly, the variant forms like [uım´ / wuım´ / vuım´] *uaim* "from me" suggest that glides simply tend to be spirantised. The same applies to the glide [j] which is described by Ó Cuív (1975:42) as a palato-velar fricative.

Our previous analysis of r-sounds in Munster seems to provide us with a way of accounting for the spirantisation of glides which does not refer to the element 'h'. Recall that in our analysis [r] (an A-glide!) is pronounced as a fricative when the element 'A' is headed and as a single flap if it is headless.

Given that the same distinction can be applied to the [v]/[w] variants then we may dispense with 'h' from the representation of fricatives and replace it with the notion of the headedness of the resonance elements. Thus the distinction of glide / fricative in Irish may be expressed in the following way.

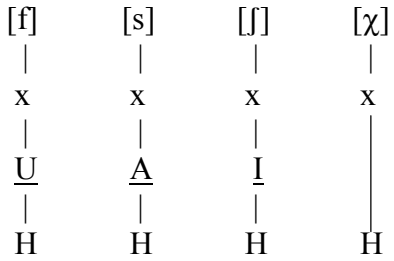
(25)



This way of representing Irish fricatives has a few considerable advantages. First of all, it allows us to see some logic in their distribution.[39] For instance, the presence of [v] word-finally, as opposed to the absence of [w] in that position, may be attributed to the headed nature of [v].[40] Likewise, the delinking of [v] in intervocalic position need no longer shock us with the number of elements lost (e.g. [uv / i:] *ubh / uibhe* "egg/gs." (3.4.2)), because all that is lost in the alternation [uv / i:] is the element 'U' and not a compound (h.U).[41] Our representation of voiced [v] seems to additionally clarify certain lenition facts in Irish. If we assumed that [v] has to be represented as (h.U) rather than (U) alone, then logically, we would have to propose that Irish [m] which, when lenited, yields [v], also has to contain the noise element 'h'. This is rather unlikely. On the other hand, our analysis not only avoids such pitfalls, but also unifies the lenition of [m] with the sporadic weakening of [n] to [r] as a mere delinking of 'N' (nasality) e.g.[knuk / kruk] *cnoc* "hill"

Now we may propose that Irish voiceless spirants have the following representation.

(26)



[39]The distribution of r-sounds is discussed in the previous sections.

[40]Similarly, the headed nature of [j], resulting from the lenited [g´] may contribute to a better understanding of such alternations as [sig´ / si:m´] *suigh / suím* "sit / I sit" (3.4.2). This, however, requires more study.

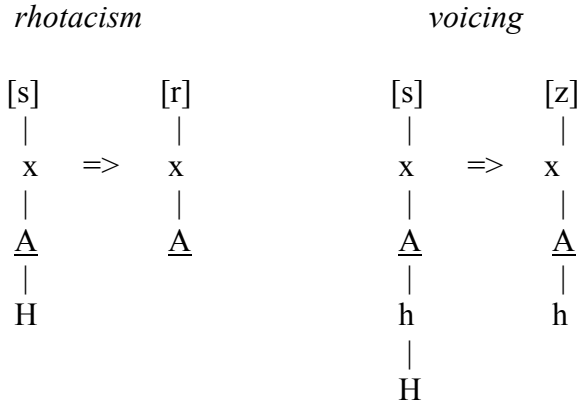
[41]The notion of the headedness of resonance elements in the consonantal system seems to have additional potential in that it may account for segmental distribution. For instance, if we assume that headless objects of fairly simplex composition e.g. [w] (U._) cannot appear word finally precisely because of their headless nature, then we may try to account for the absence of Irish [f] word-finally by assuming that it is (H.U._) rather than (H.U).

Similarly to the forms in ((25)), these representations make no use of a separate category "noise" (h) to define the objects as fricatives. The headed status of the resonance element is sufficient.[42]

It appears that these representations provide answers to our two questions concerning voice contrasts in the Irish consonantal system. Let us first concentrate on the question of the absence of voiced counterparts of certain fricatives e.g. [z] and [ʒ]. If the voice contrast is represented by the presence versus absence of the tone element 'H', then Irish [s] clearly contrasts with [r] in this respect rather than with [z], because [s] (H.A) without the tone yields (A), i.e. [r].

Note that such a representation of [s] and [r] has the potential of unifying such historical processes as rhotacism (*honos* > *honor*) with for instance the voicing of [s] to [z] (Verner's law), describing them uniformly as a mere delinking of the tone element 'H'. We also predict that rhotacism will take place in a system which has no [z] (h.A),[43] or to be more specific, in a system in which [s] is represented as (H.A) and not as (H.h.A). This is represented below.

(27) loss of 'H' (high tone):



Clearly, Irish, which has no 'h' in the representation of [s] potentially belongs to a group of languages where rhotacism would be expected, should the process of 'H'-deletion be operative in this language.

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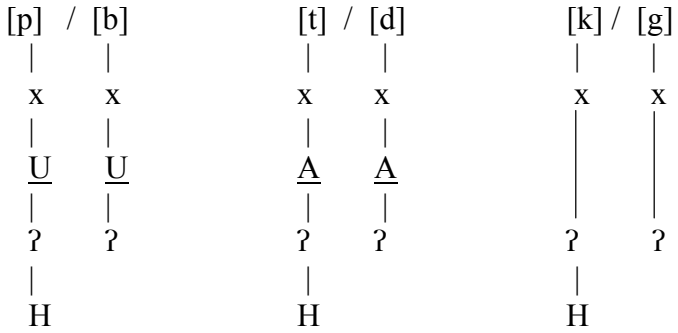
[42]One should look closer at the velar fricative which has no resonance element in our approach, and yet, it is realised as a fricative. Recent research shows that in some cases the high tone element 'H' may bring out friction (e.g. Ritter (1996)), however we leave this question unsettled.

[43]Unless we are dealing with a process which delinks 'h' (noise) and not 'H' (tone).

The absence of [ʒ] in Irish can be explained in the same fashion; its voiceless counterpart [ʃ] without the tone element will yield [j] rather than [ʒ] precisely for the same reasons. For [ʒ] to appear in the system the element 'h' must be present in consonants. Note that this analysis has also something to say about the occurrence of [v] and [ɣ] in Irish, even though they can hardly contrast with [f] and [χ] respectively. In these cases, simply, the absence of 'H' does not produce such dramatic contrasts as in the case of [s] and [ʃ], and results in the labial or velar voiced fricatives [v] and [ɣ] or in vocalisation.

Now we may turn to the second part of our initial question, namely, why the distributional gap concerning the voice distinction is found among fricatives rather than in plosives. Let us look at the representations of Irish plosives below in which we assume that 'h' is also absent from these objects. Note that the absence of 'H' in voiced obstruents still renders them as plosives though inherently weaker than their voiceless counterparts.

(28)



First of all, the voiced plosives in all series are weaker than the voiceless ones. Secondly, velar plosives are inherently weaker than other series and the voiced velar plosive appears to be the weakest. Recall that Irish exhibits compensatory lengthening due to [g] delinking (e.g. [sig´] / [si:m´] *suigh / suím* "sit / I sit" (3.4.2)) which is identical to that in which the labial fricative is lost (e.g. [n´iv] / [n´i:] *nimh / nimhe* "poison / gs."). Given that both objects are represented by a single element, i.e. (U) for [v] and (ʔ) for [g], it becomes obvious why such disparate objects, form the phonetic point of view, pattern together in the lengthening process. They are susceptible to deletion because they are the weakest voiced consonants in terms of complexity.

Finally, we are in a position to define precisely what is targeted in the lenition of the objects in ((28)), namely, the occlusion element (ʔ). However, more needs to be understood in

terms of element structure in consonantal objects as, for instance, both lenited [d] and [g] yield [ɣ] (or [j] if they are palatalised), which points to certain similarities in the representation of coronals and velars in Irish. Some aspects of this affinity can be accounted for by an assumption that Irish velars also contain 'A' while coronals may additionally have 'I'. The latter possibility will be discussed in the following chapter.

Thus, it appears that the proposal that the element 'h', i.e. "noise" as a separate category, is absent from the phonological system of Irish provides ways of understanding the phonological behaviour of segments, their inventory, as well as their distribution, which otherwise would have to be ascribed to factors of an arbitrary nature. In the remaining sections of this chapter the absence of the element 'h' from the Irish system is formalised in the form of a parameter and further advantages and consequences of this formalism are presented.

4.2.9. **The 'h' parameter**

The fact that 'h' is not available in Irish phonology does not mean, however, that the theoretical standing of this category in general is in danger. Quite conversely, given that its occurrence in languages may be governed by a parameter, it may provide a useful tool for understanding phonological processes and segmental distribution across languages, the two main areas of investigation in phonology.

Let us then propose the following parameter:

(29)

THE 'h'-PARAMETER

The occurrence of 'h' in languages is parameterised (ON/OFF)

Processwise, the parameterised occurrence of 'h' explains why the high tone (H) deletion in [s] yields [r] in some languages and [z] in others ((27)). Also, it brings together seemingly disparate phonological phenomena within one linguistic system. For example, given the representation of Irish plosives established above, it becomes clear why the lenition process, which clearly targets the element 'ʔ', yields fricatives if the obstruent is voiceless (e.g. [p] => [f]), and why voiced obstruents tend to produce glides (e.g. [g´] => [j]) thus skipping one

stage on the lenition scale. One should also bear in mind the compensatory lengthening effects in Irish which target two quite disparate objects, namely, [v] and [g]. Clearly, systems referring to such notions as *sonority scale*, *natural class*, or in fact, *distinctive features*, will be hard put to capture the affinity between the two consonants.[44]

If we take distribution into consideration, the presence versus absence of 'h' in the system accounts for the two-way ([s] - [r]) versus three-way ([s] - [z] - [r]) contrasts in a straightforward manner. In the former case the distinction is made between (H.A) and (A), while in the latter series between (H.h.A), (h.A) and (A) respectively. Additionally, the parameter, which applies uniformly to the Irish system of obstruents, directly accounts for the apparent asymmetry between plosives and fricatives in terms of voicing contrasts. Thus, Irish is a language which has the h-parameter set in OFF, i.e. it is an 'h-less' language, while 'h-ful' languages have the parameter set in ON.

From our discussion it appears that the same phonetic object, e.g. [s] can have different phonological representations in different languages. It seems that a move away from the universalism of phonological representations assumed initially in GP (KLV (1985)) is inevitable. More importantly, by explaining the subtleties of the Irish consonantal system through the h-parameter this analysis also demonstrates that such established labels denoting the "natural" classes as *voiced* / *voiceless*, *sonorant*, *glide* and *obstruent* are misleading from the phonological point of view. For example, Irish [v], which to all intents and purposes is a *fricative*, i.e. an *obstruent*, must, paradoxically, be labelled as a phonological *glide*. This ambiguous nature of [v] is expressed directly in terms of its phonological representation proposed above.[45]

In the following section we examine further advantages and predictions that the parameterised occurrence of the element 'h' in languages carries.

[44]The Jakobsonian feature [+grave] immediately springs to mind in this context. However, in our case we also need to exclude other labials than [v] and other velars than [g] from the phenomenon, which further complicates its description for a system which does not refer to complexity.

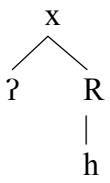
4.2.10. **The parametric occurrence of 'h' and linguistic systems**

Below, we consider the possibility that the parametric absence of the element 'h' in languages may be correlated not only with the absence of voiced fricatives, as we demonstrated in the preceding sections, but also with the absence of affricates in such systems. We begin with the facts from Irish and compare the Irish situation with the consonantal systems of Polish and English. Thus, we will concentrate here on the contrasts among coronal objects in terms of voicing, affrication and degree of palatalisation. While the first two are directly derived from the 'h-parameter' in that voice distinction among fricatives and the affrication of obstruents are indicative of a 'h-ful' system, the interaction of coronals with palatalisation, as well as the number of possible contrasts on the plane of palatalisation will be ascribed to the status of the palatalising element 'I' in a given segment.

Given our proposal that coronal consonants may be defined by the element 'A' we will investigate the possibility that the status of the palatalising element in affricates and in fact also in fricatives depends on the parameter settings concerning the elements 'A' and 'I'.[46] The prediction that we would like to see substantiated is that such a parameter will reflect the situation found in the vocalic system. Let us first consider the question of affricates in 'h-ful' and 'h-less' languages.

Harris (1990a:270) provides the following phonological representation of the affricate *ts*.

(30)



This is a contour segment in which the plosive element 'ʔ' does not combine with the noise element 'h'.[47] Thus, one may propose that affrication itself consists in breaking up the "h-ʔ"

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[45]Nilsson and Cyran (1996) account for the ambiguous nature of [v] in Slavic in a similar fashion (see also section 4.3)

[46]Indeed, it may be the case that affrication itself is derivable from the interaction of the elements 'A' and 'I'. This possibility is investigated further in the following section.

[47]For the moment, we disregard the place defining element.

relation Given the above structure and interpretation, it becomes immediately obvious that in Irish the possibility for affricates to occur is thwarted by the lack of the noise element.

(31) Irish

fricatives		*affricates*	
[s]	[ʃ]	---	---
[r]	[r´]		

This impoverished system is to a large extent due to a single parameter which defines Irish as a 'h-less' language.

On the other hand, in languages which make use of 'h', such as Polish for example, we expect both the three-way ([s] - [z] - [r]) contrasts as well as affricates. This in fact is the case in Polish as can be seen below.

(32) Polish

fricatives			*affricates*		
[s]	[s´]	[ʃ]	[ts]	[ts´]	[tʃ]
[z]	[z´]	[ʒ]	[dz]	[dz´]	[dʒ]
[r]					

Thus, what we observe in Polish is a host of fricatives and affricates, both voiced and voiceless. Namely, we have voice contrasts ([s/z],[s´/z´], [ʃ/ʒ]) and ([ts/dz], [ts´/dz´], [tʃ/dʒ]) which are due to two factors: a) the presence of 'h' in the system, and b) the presence vs. absence of the tone element responsible for the voicing distinctions.[48] Polish fricatives and affricates additionally exhibit a three-way contrast on the plane of palatalisation e.g. ([s] - [s´] - [ʃ]) and ([ts] - [ts´] - [tʃ]) which is dependent on a additional parameters, namely, on the interaction between coronality, which we represents as 'A', and the element 'I'.

What we seem to have achieved by proposing the 'h-parameter' is the possibility of defining systems which lack affricates and a voice distinction among fricatives by means of a single parameter.[49] What remains to be accounted for is the existence of coronal affricates in

[48]Unlike Irish, Polish seems to use the 'L' element rather than 'H' in consonants. This difference, however, has no consequences on our analysis.

[49]It should be borne in mind that voiced fricatives may be possible in 'h-less' languages such as Irish. Recall that the phonetic [v] / [w] distinction in Irish is expressed by the headedness or headlessness of the

general as well as the number of contrasts that they may exhibit. In other words, it is conceivable that a 'h-ful' language, which has a voice distinction among fricatives, may lack affricates.[50]

Thus, we may provisionally state that palatalisation causes affrication in 'h-ful' languages while the number of contrasts is dependent on the status of the palatalising element in these objects. Additionally, it seems that the ideal situation in 'h-ful' languages is when the number of contrasts among affricates equals that of fricatives (e.g. Polish above). Below, we provide the English data which support this correlation.

(33) English

fricatives			*affricates*		
[s]	---	[ʃ]	[ts]?	---	[tʃ]
[z]	---	[ʒ]	[dz]?	---	[dʒ]

Note that in English the number of contrasts with respect to palatalisation is parallel to that in Irish, i.e. two-way. On the other hand, the presence of [z] and affricates indicates that we are dealing with an 'h-ful' system. Thus English is like Polish as far as the 'h-parameter' is concerned in that both are 'h-ful' languages, while English and Irish seem to pattern together as far as the palatalisation effects go. Given that the number of contrasts on the plane of palatalisation can be defined by a single parameter, we will be able to account for at least three types of linguistic systems represented here by Irish, Polish and English.[51]

The initial assumption that we may wish to make is that the palatalisation contrasts are due to the A-I interaction. This assumption follows directly from the representation of coronals proposed here. Note that such an analysis will necessarily have to draw on the facts established on the basis of the behaviour of these elements in the vocalic system. Our

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vocalic element. However, the important point is that no such distinction should be possible among coronals where the element 'A', whether headed or headless, will yield various varieties of r-sounds but not [z] for instance. One cannot exclude the possibility, however, that the representation of [z] in some languages may be (L.A).

[50]It seems that French is such a language (Lass (1984:152)).

[51]The fourth type of linguistic system which could possibly be comprised by the set of these two parameters is French, given that the palatalisation parameter is able to capture the French situation.

analysis of the Irish vocalic system revealed that 'I' does not license (resonance?) operators hence *(A.I) is illegal.

We shall return to these problems in the following chapter. In the meantime, let us consider one more significant prediction that our analysis makes concerning the affinity between glides and fricatives, which is derived from the notion of headedness. We will examine the theoretical aspect of a historical shift from [w] to [v] in Slavic.

4.3. **Headedness as friction in language change**[52]

In the previous section we mentioned the process of rhotacism which, potentially, could be unified with the other effects of Verner's Law if the languages which had rhotacism could be said to be indeed "h-less". In this section we shall consider another historical development which concerns most Indo-European languages, with a notable exception of English. Namely, we will see how the shift from the Common Slavic (CSl) **w,* i.e. [w] to [v] in certain Slavic languages can be captured in a formal and at the same time explanatory fashion. Since the languages discussed below are "h-ful", it will be interesting to observe how the two mechanisms producing friction, i.e. headedness and the element 'h', interact.

In present day Slavic languages different reflexes of the historical glide **w* are found which range from the original glide [w] (e.g. East Ukrainian [wɔda] "water", [ławka] "bench"), through a voiced labial fricative [v] (e.g. Standard Ukrainian [vɔda]) to a voiceless labial fricative [f] (e.g. Polish [wafka]), or even a voiceless velar fricative [x] (North Russian [łaxka]).

The data below are taken from Nilsson and Cyran (1996) and illustrate how the distribution of the reflexes is dependent on the prosodic position. Quite uncontroversially, the strong position can be identified with the beginning of the word (or "syllable"), i.e. the prevocalic position, while the weak environment can be identified with the traditional concept of the "coda".

[52] This section is based on Nilsson and Cyran (1996).

(34)

a.	b.	c.	
[w] (E.Ukr.)	[v/w] (St.Ukr.)	[v/f] (Polish)	
[**w**ɔda]	[**v**ɔda]	[**v**ɔda]	"water"
[sli**w**]	[sli**w**]	[swu**f**]	"words-g.pl."
[ła**w**ka]	[ła**w**ka]	[wa**f**ka]	"bench"

The forms in ((34)) illustrate three distinct stages in the development of the CSl **w*. The first stage (a) seems to preserve the original state of affairs in that the labial glide is found in all prosodic positions. The second stage (b) constitutes the first step of the phonological change in question and is characterised by a shift in articulation from [w] to [v] in strong positions but not in weak ones as exemplified by the Standard Ukrainian [vɔda] *voda* "water" and [sliw] *sliv* "words-g.pl.".

What could be taken as the result of the second full step in the development of the CSl **w* is the situation illustrated in stage (c) where [v] no longer alternates with the glide [w] but with a voiceless labial fricative [f]. This can be observed in, for instance, Polish. Thus, what seems to have been involved in the historical development of the CSl **w* in various Slavic languages is a step-by-step strengthening of the original glide, that is a process of composition, which is provisionally illustrated below.

(35)

glide		*fricative*
(U)	>>>>>>>>>>>>	(L.h.U)

It is assumed in GP that a process of composition must have a local source. Thus, in the case of the shift illustrated in ((35)) we must establish where the elements 'L' and 'h' come from, otherwise, the shift has to be regarded as arbitrary in nature.

Nilsson and Cyran propose an analysis of the different stages of the shift which avoids the problem of locality and offers a number of insights into the nature of the change. In the group of languages which retained the glide [w] in all positions the object is represented uncontroversially by a simplex object containing just one element 'U' in the operator position, i.e. (U._).

The actual shift is described in two stages which are reflected in such present day languages as Standard Ukrainian and Polish. First, the object became reanalysed as a headed 'U', i.e. (U) in strong positions. This is shown below.

(36)

1st step

(U._) > (U)

This step involves a mere switch in status of the element 'U' in strong positions, which is a widely accepted phonological operation in Government Phonology. For example, the status switch is used in accounting for vowel reduction in recessive positions (Harris (1994a)) and for ATR harmony (Charette (1994)).

Although this shift involves a negligible alteration from the phonological point of view its phonetic consequence is quite dramatic. Namely, the headed object is phonetically realised with audible friction. Note that the distribution of the historical **w* in Standard Ukrainian is parallel to the distribution of the r-sounds in Irish in that the stronger, headed object is licensed only in prosodically strong positions while the weaker, headless object is found in recessive environments.

Thus the alternation between [v] and [w] in Standard Ukrainian receives a fairly straightforward account which is applicable to other languages too. What is more, the analysis of the alternation tallies with the facts from the vocalic system of that language. Namely, the round back vowel in Standard Ukrainian has two realisations, that is, a tense [u] which is found under stress and a lax [ʊ] which appears in recessive positions. This point is crucial to the analysis of the shift ([w]>[v]) as well as to the central claim made in this book that the vocalic and consonantal systems work in the same way.

The correspondence between the [u]/[ʊ] and [v]/[w] in Standard Ukrainian additionally points to the possible motivation for the shift ([w]>[v]) in strong positions. Most probably what is at play here is a single parameter on the status of the element 'U' which applied to both the vocalic and consonantal systems. As a result, the alternation [v]/[w] arose,

which corresponds to the Irish [r]/[ɾ], as well as a new object [v] appeared which sounds like a fricative but has to be treated phonologically as a glide.[53]

The representation of the Ukrainian [v] as a simplex object is advantageous for a few reasons. One of them is the possibility of accounting for the fact that certain [v]'s alternate with the glide [w] while others with [f] in otherwise identical environments. This brings us to the second step in the development of the CSl **w* which is illustrated below.

(37)

2nd step

(U) > (L.h.U)

This step involves a reinterpretation of the phonetically present properties as phonological. Namely, friction, which is typically represented by 'h', and voicing, defined by 'L', are now present in the phonological representation. The reinterpretation might be motivated by the need to bring the new object in line with other fricatives which are defined in terms of the 'noise' and tone elements.

Note that this time, the object cannot alternate with a glide in weak positions, but rather, like other "obstruents", it becomes devoiced. This phenomenon is captured in Government Phonology in term of unlicensing of the tone element 'L', hence the Polish form [swu**f**] as opposed to the Standard Ukrainian [sli**w**] (Brockhaus (1995)).

To conclude: the two-step analysis of the historical shift describes the change in an nonarbitrary fashion and offers a few valuable theoretical predictions. For example, we are able to predict that obstruentisation of glides will result in a voiced obstruent because we are always dealing with a phonologisation of the so called spontaneous voicing. In this respect, it is irrelevant how a given language defines the laryngeal contrasts, i.e. by using 'L', 'H', or both tone elements.

Additionally, the interplay between the two ways of expressing friction, i.e. through headedness of the resonance element, or by means of a separate element 'h', may lead to ambiguous situations in "h-full" languages. This is not only a true but in fact a desired

[53] Such an ambiguous object is independently needed in phonology in order to account for such puzzling phenomena as, for example, the absence of voice assimilation from the initial [v] in Russian, (see e.g. Jakobson (1956); Andersen (1969)).

situation for Polish (Gussmann (1981)), Russian (Andersen (1969)), Slovak (Rubach (1993)) and Hungarian (Siptár (1996)) to name but a few languages.

4.3.1. **Summary**

In the above sections we tried to demonstrate that the headedness of resonance elements can bring about friction. We also considered some consequences of this possibility. Thus, in Irish, the fricative trill [r] is distinguished from a flap [ɾ] by means of the status of the element 'A'. This was the first step in our analysis to show that headedness may produce a narrowing effect in consonants just as it does in vowels. Recall that the tense (ATR) or close vowels are represented as headed (4.2).

Another area in which the findings concerning the vocalic and consonantal systems corresponded with each other was the interaction between the elements 'A' and 'I'. In the vocalic system the two elements interact in the phenomenon of palatalisation (element 'I') spreading. We found that the element 'I' may only affect 'A' in headless vowels, while the headed (A) resisted palatalisation. These effects find an exact reflection in the consonantal system of Irish where [r] (A) resists palatalisation unless it is reduced (weakened) to the operator position. Taken together the Irish facts support the claim that headedness produces friction as well as point to the fact that coronality should be represented by the element 'A'.

The first genuine instance where headedness brings about phonetic friction was observed in the case of the Irish [v] sound and was then extended to other fricatives. It is here that the mechanism of headship allowed for dispensing with the noise element 'h' from the Irish system. However, as demonstrated in the preceding sections, 'noise' as a separate category is needed in other languages, and it seems evident that headedness cannot replace the element 'h' altogether.

There are a few arguments in support of this assertion. One of them is that headedness alone produces defective systems in languages lacking the 'h' element. For example, Irish, which has no 'h', does not have voicing contrasts among fricatives and lacks affricates altogether. Thus, from the point of view of language typology, headedness must be regarded as insufficient for defining consonantal systems. In other words, the typological distinction

between Irish and e.g. Polish would be impossible to state if headedness was the only mechanism defining friction.

On the other hand, the interaction between the h-parameter and the possibility to define friction by means of headedness may have a significant influence on the understanding and accounting for certain historical processes. The analysis of the historical shift from the Common Slavic glide **w* to a labial fricative clearly demonstrates the advantage of defining friction by means of headedness and provides further arguments for treating the occurrence of 'h' as parametric in nature. This property is present in Slavic languages and its interaction with headedness allows for gaining interesting insights into the workings of historical phonology.

In the following sections, which will be by and large speculative in nature, the model in which coronality is represented by the presence of the element 'A' will be pushed to its logical conclusion. Once again the notion of headedness will be shown to play a crucial part in phonology.

4.4. **Coronal palatalisation as element interaction**

Below, we consider a few additional problems connected with our assumption that coronal consonants in Irish contain the element 'A' with respect to their interaction with the element 'I'. Specifically, we need to understand the representations of the palatalised versions of [s] and [r]. Recall that we represent these consonants as (H.A) and (A) respectively.

In the analysis of the distributional facts concerning the palatalised [r´] we established that this segment exhibits some characteristics which allow us to correlate the r-facts with what we found in the vocalic system. Namely, A-headed [r] resists palatalisation just as the A-headed vowels do e.g. [bɑn´ə] *bainne* "milk". There are two contexts in which Irish [r] resists interaction with the element 'I': a) in word-initial position where [r] is headed, and b) when supported by a following coronal e.g. [do:rn´ə] *doirne* "fist/pl.", in which case we claim that a similar phenomenon of A-support (bridge) is responsible for the effects, just as in the vocalic system (e.g. [sp´el´ə] *speile* "scythe/gs." (see 2.3.3 and ((44)) below).

A problematic aspect of this analysis concerns the structure of the palatalised [r´] which is a fricative trill, hence a headed object, and whose headedness, it seems, is due to the element 'I'. The structures we proposed in 4.2.5 for the velarised and the palatalised [r] are supplied below again.

(38)

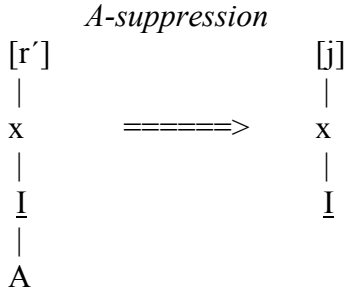
a. *velarised flap*

b. *palatalised trill*

The status of the element 'A' (headless) in these objects is due to the weak position in which they are found. Recall that it is due to the headless nature of 'A' that [r] may be velarised or palatalised. The velarised flap results from the fact that the velarising element 'U' does not normally become the head of the affected object in Irish. This is what we found in the analysis of the vocalic system. On the other hand, the fricative nature of [r´] may be derived from the headedness of 'I' which also affects vowels as the head.

This is precisely where the problem begins, as the representation of [r´] as (A.I) seems to be illegal in Irish. In the vocalic system we found that only (A.I._) and (I.A) are possible. This is due to the parameter *I does not license operators*. Thus what we should expect here is A-suppression, as in [f´ar / f´ir´] *fear / fir* "man/gs." or [sop / sip´] *sop / soip* "wisp/gs.". In other words, what we expect is [j] rather than [r´].

(39)



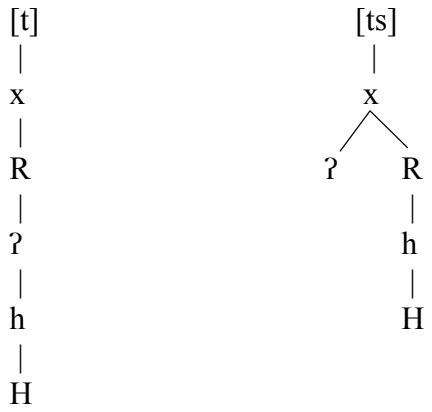
Interestingly enough, this is what evidently happens in Gweedore (Donegal Irish), where the palatalised [r´] is realised as [j] e.g. [ga:ji:] *gáirí* "laughing" (Ó Siadhail (1989:100)). In

Munster, however, this does not happen. The question then is why 'A' is not suppressed in [r´], and if it stays, what should be the phonological representation of this object?

One way of accounting for this problem would be to refer to certain constraints on what type of segmental decomposition can take place in a given system. Surely some such constraints must exist. For instance, the analysis of rhotacism ([s]>[r]), whether correct or not, relies on the exclusion of the possibility that this process might delink both 'H' (tone) and 'h' (noise). Otherwise, the distinction between [s]/[r] and [s]/[z] will depend on what a particular process targets ((H, h) or (H) alone), rather than on the representation of the targeted objects ((H.A) or (H.h.A)). Thus the brunt of responsibility would be shifted to the process rather than to the phonological representation, the latter option being intuitively more constrained.[54]

Thus, one might accept the possibility that the palatalisation affecting the coronals need not result in segment decomposition, so that some phonological elements are lost. Alternatively, one might assume that decomposition itself need not require element loss. One example of such a phenomenon is provided by Harris (1990a:270), namely, affrication which we may, following Harris, illustrate in the following way.

(40)



This type of decomposition involves the dissolution of the compound (here: [t]) into a contour structure. Given that such a phenomenon is effected by palatalisation we may assume that a similar structure is formed in Irish [r´].

[54]The correctness of this intuition is supported by the distributional facts which correlate [s]>[r] vs. [s]>[z] systems with the absence or presence of 'h' in them.

(41)

This form accounts not only for the trilled nature of [r´] (headed), but also for the fact that a headed 'I' does not fuse with the element 'A', and yet, the latter element remains licensed in the representation.

The other segment which, like [r´], has no right to contain 'A' because it seems to be I-headed, is the fricative [ʃ]. In the previous subsection this object was provisionally given the following representation.

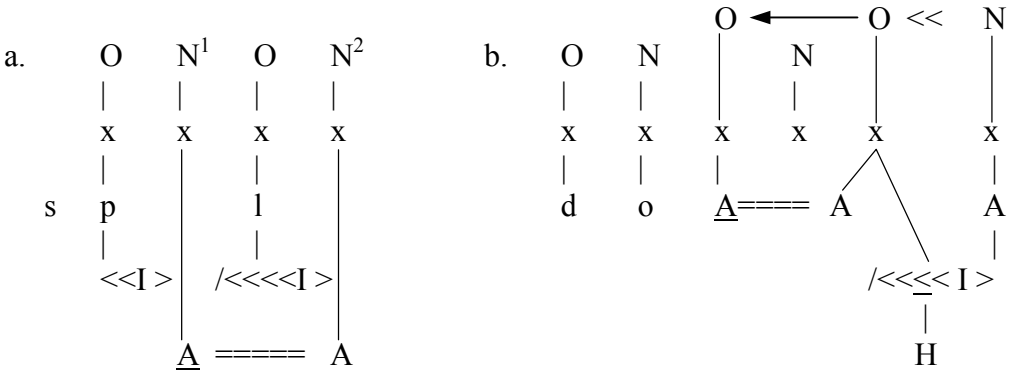
(42)

On the other hand, it seems that this object also has to retain the element 'A' in Irish. Recall that in the analysis of [r] in homorganic contexts where [r] resists palatalisation, due to A-support (bridge) from the following governing onset, [ʃ] still patterns with other coronals e.g. [dorəs / dir´iʃ / do:rʃə] *doras / dorais / doirse* "door/gs./pl.". If we accept the structure of [r´] ((41)) above as correct then there is no reason why [ʃ] should not have the following form.

(43)

The presence of 'A' in [ʃ] follows from our analysis of [r] in homorganic contexts, where the function of the A-bridge is to disallow decomposition by licensing 'A' as the head of [r].[55] Let us look at the structures involving A-support in vowels and consonants again.

(44)



[sp´el´ə] *speile* "scythe-gs." [do:rʃə] *doirse* "door-pl."

In [sp´al] *speal* "scythe" the vowel is fronted; however, we left open the question whether 'A' and 'I' fuse in [a] or whether we are dealing with a phonetic effect alone.[56] At any rate, this analysis supports the claim that Irish [ʃ] contains both 'A' and 'I'. In what follows we will consider some evidence which points to the possibility that other Irish coronals may contain the element 'I'.

4.4.1. **'I' in Irish coronals**

Proposals attempting to correlate coronality with front vowels have a well established history now.[57] For example, in an attempt to unify palatalisation effects and the representation of coronals Lahiri and Evers (1991) propose a model of feature geometry which groups coronal consonants, front vowels and the palatal glide under a single articulator node Coronal. Similar claims are made in Hume (1994). This proposal, if translated into the framework of

[55]Another argument for this representation of [ʃ] may be that we might wish to reserve the compound (H.I) for the sound [χ´] in Irish.

[56]For the parallelism between the alternations [a/e] ([sp´al / sp´el´ə] *speal / speile* "scythe/gs.") and [iə / e:] ([gr´iən / gr´e:n´ə] *grian / gréine* "sun/gs.") see e.g. 3.3.6.

Government Phonology, would be tantamount to saying that coronal consonants contain the element 'I' (cf. Smith (1988)). The question is how to reconcile the model which uses 'A' for coronality with those which point to the presence of 'I'? Below we consider the possibility that non-palatalised coronals may contain the element 'I'.

Some evidence to that effect can be found in Irish in such phenomena as for instance the fronting of low vowels ([ɑ] to [æ]) by non-palatalised coronal consonants in Cois Fhairrge, e.g. [dæ:r´][58] *dair* "oak" (de Bhaldraithe (1945:12), Ní Chiosáin (1992)), which typically occurs after palatalised consonants. In Munster, the short vowel [e], which can only follow a palatalised onset, is found in a few forms when preceded by [s] or [r] e.g. [sev´ir´] *saibhir* "rich" and [rev´] *raibh* (past form of "be"). Additionally, the historical loss of *dh* resulted in the development of the diphthong [ai] in a basically velarised environment, e.g. [raiᵊrk] *radharc* "sight", which may suggest that the element 'I' is a residue of the lost coronal.[59]

Much stronger evidence for the presence of 'I' in coronals is provided by the behaviour of word-initial [r] in Irish. Recall that word-initial [r] in Irish is not palatalised, e.g. [ri:] *rí* "king", but when such a form is preceded by a vocalic particle, then palatalisation takes place e.g. [ə r´i:] *a rí* "king/voc.". We account for this palatalisation by comparing the intervocalic position of [r´] in [ə r´i:] to the word-medial and final situations in which [r] may be palatalised due to the weakening (intervocalic) environment. The question that may be asked here is what palatalises the [r] word-initially. The only morpho-phonological alternations in that position involve lenition or eclipsis but not palatalisation.

One possible answer is that the palatalisation effect is due to the high vowel [i:], together with the fact that the [r] is weakened in [ə r´i:]. However, this need not be true because, on the one hand, our analysis of the vocalic system shows that the quality of the vowel need not influence the onset, and secondly, there are data which seem to point to the fact that the quality of the vowel has nothing to do with the palatalisation of the initial [r], as

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[57]See for example the feature system proposed in Jakobson, Fant and Halle (1952) where [+grave], [+diffuse] defined the vowel [i] as well as dental/alveolar consonants.

[58]The length is phonetic. Ní Chiosáin (1992) considers the fronting as phonetic too.

[59]More evidence of this kind can be found in e.g. Smith (1988) and Hume (1994).

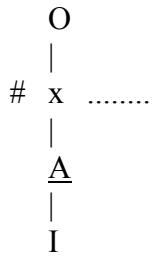
the phenomenon occurs before back vowels too. Below we repeat the data taken from Sjoestedt (1931:46) and Ó Cuív (1975:49) which illustrate the sandhi phenomenon.[60]

(45)

[ru:n]	*rún*	"secret"	[ə r´u:n]	*a rún*	"his secret"
[rug]	*rug*	"take/past"	[də r´ug]	*do rug*	"he took"
[rau]	*rogha*	"choice"			
[rud]	*rud*	"thing"	[də r´au r´ud]	*do rogha rud*	"your choice"

In these forms, it seems, there is no local source for the palatalising element 'I' in e.g. [ə r´u:n].[61] The only process that we may blame for this phenomenon is lenition, i.e. weakening in intervocalic position. The question is if we should not accept the fact that this element is already present in the non-palatalised form. In other words, should we not propose that the initial [r] in Irish has the following representation:

(46)



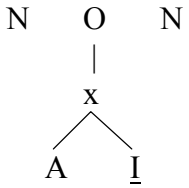
Note that the compound (I.A) is legal in Irish. However, the question is if this could be the representation of word-initial [r] and of coronals in general. Another question which should be asked is what would happen in languages which disallow the (I.A) combination.[62] Let us demonstrate how the palatalisation of such a structure might result from weakening in the lenition context, i.e. when 'A' is demoted to the operator position. We need to assume that the element 'I' becomes the head of the object if 'A' is demoted, which results in breaking up the compound into the contour structure, a point discussed in the preceding section.

[60]Since the palatalisation spreading in Irish is directional and goes from right to left, the particle has to be also excluded as the possible source of 'I'.

[61]Also, we are not dealing here with any morpho-phonological alternation of the type *cat / cait* "cat/gs." as this typically affects the right edge of lexical forms.

[62]Cf. e.g. Polish, which disallows *(I.A), and has a licit (A.I) compound.

(47)



Such an analysis derives the palatalisation of initial [r] directly from its representation, although certain aspects of this mechanism require a comment. Recall that the headed status of the element 'I' in this object is directly derived from the nature of palatalisation in Irish. There is, however, one problem with this analysis. Namely, if the palatalisation of [r]'s may be derived from their representation by decomposition in weak environments, then we should expect all internal [r]'s to be palatalised, which is not the case as we have both palatalised and velarised [r]'s word internally and finally. It appears, however, that not all initial [r]'s are palatalised in weak environments.[63] This fact allows us to retain the proposal that some [r]'s may be represented by the compound (I.A) while others (the velarised type) by (U.A). The only objection that one may have to this proposal is that we have two quite different representations of [r]-sounds.[64] Below we show that the initial palatalisation or [r]'s may be given a different interpretation, i.e. one which accounts for the headedness of the element defining the palatalisation of [r´] and for the velarised [r]'s word-internally. However, it should be treated as an alternative proposal rather than an argument against representing coronality as a combination of 'I' and 'A'.

Our analysis of the vocalic system provides a way of accounting for the phonological presence of 'I' in forms like [ru:n]. It refers to the notion of element sharing which is formalised in terms of the following condition.

(48)

THE SHARING CONDITION

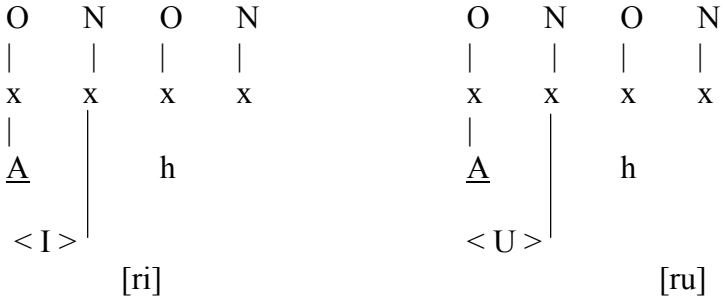
Nuclei share the element 'I' or 'U' with their onsets.

[63]Aidan Doyle (p.c.).

[64]The two structures must be contrastive, therefore, the fact that they have different representations should not be too controversial, especially that the distinction between the palatalised and velarised [r]'s must be made in terms of the elements 'I' and 'U' respectively.

In other words, we may say that every Onset-Nucleus domain is defined by one of these two elements. The various structural forms by which this condition is reflected in the phonological representations in Irish are discussed at length in 2.3.6 and 3.4.1. What is of interest to us here is the word-initial situation involving [r]. Earlier, in 2.3.6, we suggested that the shared element 'I' or 'U' is not licensed in this object and proposed the following structures for [ri] and [ru], the variant pronunciations of *rith* "running." The structures below are already modified to include the representation of initial [r] as A-headed.

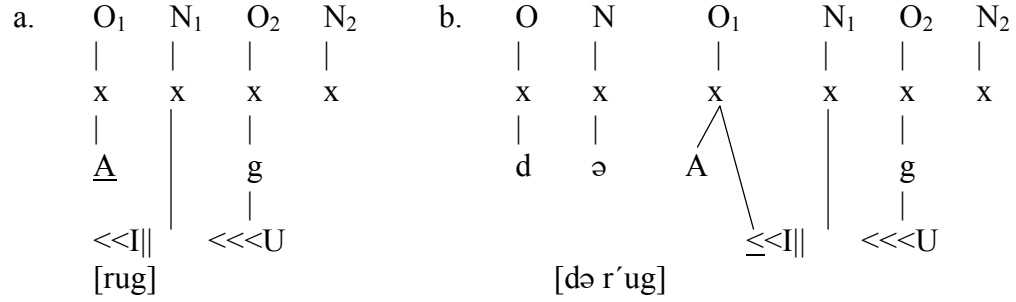
(49)



Thus [r] in this position behaves like an empty onset in that the shared element need not be manifested in the lexical form. Or, to be precise, the shared element is manifested in the nucleus only. Recall that in the case of empty onset specification the shared element is manifested by palatalisation or velarisation of the preceding definite article, e.g. [oχər´] *eochair* "key", which begins with a back vowel and palatalises the article in [ən´ oχər´].[65]

It seems then, that we are capable of accounting for the unexpected palatalisation of the initial [r] when sandwiched between vowels. This is illustrated below on the basis of the forms [rug] / [də r´ug] *rug / do rug* "take/(past) / he took".

(50)



[65]Similarly, words beginning with high vowels can velarise the article as the shared element is 'U' e.g. [ən i:hə] *an oíche* "night".

The domain O_1-N_1 is defined by the element 'I' which cannot be licensed in the onset because the initial headed 'A' is not affected by palatalisation.[66] This element is not licensed in the nucleus N_1 either as this nucleus is defined by the element 'U', which is spread from the following velarised consonant (cf. e.g. [pˊubər] *piobar* "pepper"). Thus, 'I' forms a buffer (||) to further spreading of 'U'. When the onset O_1 finds itself in a weak environment, i.e. in an intervocalic context, the headedness of 'A' is lost and the object may license the shared element 'I'. What is important to remember at this stage is that the element defining palatalisation becomes the head of headless vowels e.g. [sop / sipˊ] *sop / soip* "wisp/gs.". Thus one may propose that the headed nature of the element 'I' in [rˊ] is directly derivable from the nature of palatalisation in Irish.[67]

It appears that we may account for the initial palatalisation without having to propose that 'I' is part of coronal objects, yet the forms are still derived from the phonological representation established on the basis of other facts. One advantage of this analysis over the one which assumes that [r] is an (I.A) compound lies in the ability to account for the headed nature of 'I' in [rˊ]. The other advantage is that we predict that the velarised nature of certain word-medial and initial [r]'s follows from the type of the shared element (U) rather than from a different representation of [r], i.e. one without the element 'I'. Additionally, the weak (flapped) variety of velarised [r]'s follows from the fact that, unlike 'I', the velarising element tends to affect objects as an operator rather than as the head.

Thus it seems that on the basis of the scant Irish evidence one cannot decide whether the coronal consonants should contain 'I'.[68] However, one should acknowledge the fact that with certain additional assumptions, e.g. the different representations of Irish [r], it is possible to maintain this alternative. After all one has to take into account other types of coronal segments, e.g. fricatives, to see the potential merits or additional difficulties for this proposal. Below we look at some facts from Polish which also suggest that coronality might be

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[66]The same behaviour is manifested by headed 'A' is found in the vocalic system e.g. [bɑnˊə] *bainne* "milk".

[67]Admittedly, given this account of I-headedness, we may also maintain the idea that initial [r] is (I.A), in which case the weakened [r] will also yield an I-headed object.

[68]If certain [r]'s could be shown to be (I.A) then one might be able to account for such mysterious historical processes as the umlaut effected by [r] in Old Norse e.g. *gler* "glass" (Edmund Gussmann (p.c.)).

represented by a compound involving 'I' and 'A'. On the other hand, in sections 4.4.3 and 4.4.4 we consider briefly some theoretical consequences of such a possibility with respect to palatalisation effects and to the defining of phonological oppositions in Irish, Polish and English.

4.4.2. **The status of 'I' in Polish affricates and coronal fricatives**

In the case of Polish we have an additional mechanism which will help us determine the status of 'I' in consonantal objects. Namely, as mentioned in 2.1.4, Polish consonants and high vowels must agree in certain respects (C-V harmony). The onset-nucleus harmony in Polish is reflected in the distribution of high front vowels (Gussmann, Kaye and Cyran (in prep.)). The headless vowel [ɨ] (I._) may follow an onset which is headed either by 'I' ((51)a) or by any other element ((51)b), but it cannot follow a headless consonant ((51)c) or one with 'I' as an operator ((51)d). The four situations are illustrated below.

(51)

a.		b.		c.		d.	
ʃ	ɨ ...	p	ɨ ...	*k	ɨ ...	*p´	ɨ ...
|	|	|	|	|	|	|	|
(I)	(I._)	(U)	(I._)	(_)	(I._)	(I.U)	(I._)
szyć "to sew"		*pytać* "to ask"		---		---	

On the other hand, a headed 'I' in the nucleus requires an 'I' operator in the preceding onset.

(52)

a.		b.		c.		d.	
s´	i ...	p´	i ...	k´	i ...	*t	i ...
|	|	|	|	|	|	|	|
(I.A)	(I)	(I.U)	(I)	(I._)	(I)	(A)	(I)
sito "sieve"		*piwo* "beer"		*kino* "cinema"		---	

Similar restrictions hold for Polish affricates.

(53)

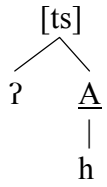
[tʃɨ]	*czy*	"if"	*[tʃi]
[ts´i]	*ci*	"these/masc."	*[ts´ɨ]
[tsɨrk]	*cyrk*	"circus"	*[tsi]

It appears that the status of the element 'I' must not be identical in the onset and the following nucleus. Following this observation we may establish the status of 'I' in the above affricates in the following way. Since [ɨ] is headless (I._), then the preceding consonant must be I-headed, or else, contain no 'I' e.g. [pɨtats´] ((51)b). Thus we may propose that Polish [tʃ] is I-headed because it is followed by a headless [ɨ], while [ts´] has 'I' as an operator and is followed by a headed [i], parallel to [p´ivo] "beer" and [k´ino] "cinema" ((52)). On the other hand, [ts] would either have to be viewed as I-headed or I-less as it is followed by [ɨ] (cf. *szyć* and *pytać* respectively ((51))).

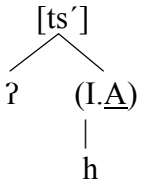
Initially, we will assume here that [ts] has no element 'I' and that parallel to [t] and [d], which are not palatalised, it is defined as an A-headed object. The tentative representation of the Polish affricates is presented below. For the moment, we disregard the interaction between 'A' and 'I' (H is also ignored), and concentrate only on the status of 'I'.

(54)

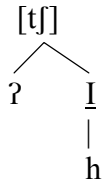
a. *no 'I'*



b. *I-operator*

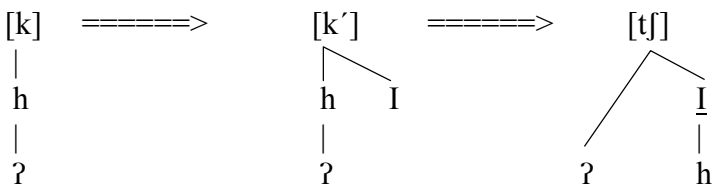


c. *I-head*



We assume that in [tʃ] ((54)c), the element 'A' is not present and the compound contains only one vocalic element, namely, a headed 'I'. The choice is supported by frequent [k]>[tʃ] alternations, e.g. *dome*[k] / *dome*[tʃ]*ek* "small house / diminutive", which are best understood as a shift from a headless consonant ([k]) to an I-headed one, with concomitant affrication. In fact there are two types of palatalisation which affect Polish [k], i.e. [k]>[k´] and [k]>[tʃ] (Rubach (1984)). In GP terms, the first of them adds an 'I' operator to a headless object (h.ʔ.I._), while the other produces an I-headed object (h.ʔ.I) with concomitant affrication.[69]

(55)



[69]Rubach also assumes, following Gussmann (1980:16) that there is also a so called 2nd velar which alternates with dental affricates or spirants e.g. [k]>[ts] (*Pola*[k] / *Pola*[ts]*y* "Pole/pl.").

Note that the different types of palatalisation are neatly accounted for by means of the status of the element 'I', and that a very similar gradation due to the status of 'I' was given in ((54)) above for the three-way coronal contrasts.

Returning now to [ts] ((54)a), one may adopt the view that the representation is similar to that of [t] (A-headed consonant), with the contrast represented by affrication alone. On the other hand [ts´] ((54)b), has to contain 'I' as an operator due to C-V harmony. It seems, however, that we need to test this analysis further. The issue we want to concentrate on is that of the representation of the affricate [ts´] by a (I.A) compound. The question we want to ask is whether the compound is licit, and, if so, why should such a combination evoke affrication in Polish rather than a mere palatalising effect e.g. [t´] just as in the case of [k´]?

In order to understand better the Polish system we need to establish the necessary parameters concerning the A-I interaction in this language. Since there is no contrast between Polish mid vowels e.g. [e] vs. [æ], we need to assume that there is only one licit compound involving the two elements, i.e. either (I.A) or (A.I). One way to establish the correct representation is to look at the distribution of the vowel [e] with respect to the affricates represented above. We predict that the I-headed object (A.I) should behave like an (I) in that it will follow an onset with an 'I' operator. On the other hand, if the licit object is (I.A), then we should not find it following an onset with an 'I' operator (cf. *[p´i...] ((51)d)). It seems, however, that [e] may be found in all possible combinations, which suggests that there are two [e]'s in Polish. We provide the putative representation of [e] by each word.

(56)

[tsena]	*cena*	"price"	(I.A)
[ts´etʃ]	*ciecz*	"liquid"	(A.I)
[tʃesats´]	*czesać*	"to comb"	(I.A)

Gussmann, Kaye and Cyran (in prep.) propose that there are indeed two representations yielding phonetic [e] in Polish; however, only one of them is a combination of 'A' and 'I', namely, (A.I), the other being a headless (A._). This distinction accounts, among other things, for the fact that a headless consonant ([k]) cannot be followed by a headless [e] e.g. *[ke...] (cf. *[ki...] ((51)c)), while the I-headed [e] palatalises [k] to [k´] e.g. [k´edi] *kiedy*

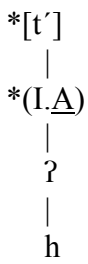
"when". Let us assume then that the representation (A.I) is indeed correct and tentatively propose that the compound *(I.A) is illicit and eliminated from the system by means of the following parameter (Licensing Constraint).

LC1 *A does not license operators*

The obvious consequence of this assumption is that the representation of [ts´] (in terms of resonance elements) as (I.A) must be treated as illicit. However, this apparently problematic move may turn out to be quite beneficial to our analysis as it offers some valuable, though, not altogether obvious predictions.

We may now try to interpret the palatalisation distinctions among Polish fricatives and affricates in the following way: A-headed objects do not license operators. Hence the coronals like [t], [d], [r] are not palatalised as this would yield illicit objects such as ((57)) below.

(57)

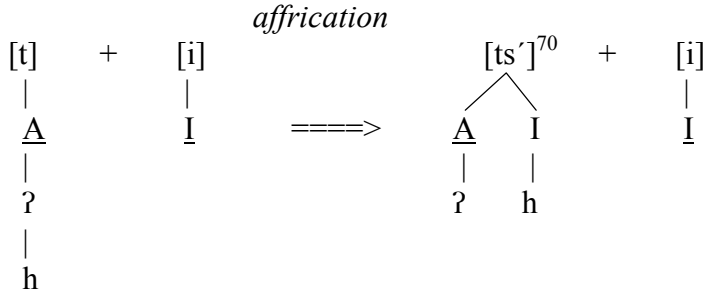


Note however that this is the structure that we proposed for [ts´] where 'I' has to act as an operator when followed by an I-headed vowel e.g. *ci* "these". How do we account for this object then? The interpretation proposed here is that in a situation when the A-headed onset must contain an 'I' operator due to C-V restrictions, i.e. when it is followed by an I-headed vowel, then the licensing of 'I' in such an onset does not entail fusion with 'A'. In a sense, the situation resembles that between 'ʔ' and 'h' in affricates in that 'I' and 'A' are present in the consonant but they do not fuse. This correlation might in fact allow us to account for the affrication of "palatalised" [t]'s in Polish ([t]>[ts´]) in a fairly direct way.

Clearly, in the context illustrated in ((58)) below we are dealing with a conflict between the licensing constraint precluding I-licensing by the A-head in the onset, and the C-

V harmony requirements in Polish which state that I-head in a nucleus must be preceded by I-operator in the onset.

(58)



The element 'I' may only be licensed in the onset if it is not fused with A-head. This results in a contour structure, i.e. in affrication.

The question now is whether the parameter proposed for Polish is able to account for all the contrasts among coronals with respect to palatalisation. We have seen two types of element 'I' operation on the Polish plosives, namely, the element 'I' may become the head or the operator of the affected consonant. The former instance can be illustrated by the palatalisation of [k] to [tʃ] with concomitant affrication. The latter type, when 'I' becomes the operator, may have two outcomes, namely, the addition of secondary articulation e.g. [k´], or the affrication of [t] to [ts´]. The two different results of licensing 'I' as an operator can be accounted for in the following way. The affrication of [t] to [ts´] is effected not so much by the 'I' operator as by the fact that the 'A' head of the coronal object cannot license 'I', hence the two elements do not fuse. We would like to propose that this impossibility to be fused into *(I.A) causes affrication because, as can be seen in the case of [k´], 'I' as an operator does not have to cause affrication hence the contrast [k´] vs. [tʃ].

It seems that this analysis leaves the following questions unanswered. First of all, if only I-A break-up ([ts´]), or an 'I' head ([tʃ]) can cause affrication,[71] then what is responsible for the affricate [ts], which we assume to be A-headed? Additionally, since we account for the three-way contrast [ts]-[ts´]-[tʃ] as (A)-(A+I)-(I), we seem to be missing a possible object

[70]Since [ts´] patterns with [s´], we will assume that this fricative also forms a contour structure with respect to the elements 'I' and 'A'. The contrast between the two objects is due to the absence of 'ʔ' from the representation of [s´].

[71]This we claim on the basis of [k´].

(A.I), i.e. the licit I-headed combination which we established on the basis of the interaction of the elements 'I' and 'A' in the vocalic system of Polish. One should ask the question if it is possible that this object may not be used in the consonantal system and, consequently, what makes the illicit I-A combination ([ts´]) more privileged than the well-behaved and expected (A.I) in Polish? A tentative answer to these questions is given in the following section.

4.4.3. **Palatalisation of "(I-A) coronals" as decomposition (Irish).**

The putative representation of coronal consonants in terms of a I-A combination has some grave consequences. One of them is that this proposal definitely parts ways with the assumption that coronality is best understood as under- or non-specified for place (see e.g. Avery and Rice (1989), Paradis and Prunet (1991), Backley (1993), Harris (1994b)). Thus our aim should be to demonstrate how this representation is capable of accounting for the general recessiveness of coronals, as witnessed in, for example, their transparency and participation in assimilations.

The issue requires more study and cannot be fully explored here. However, in the light of the facts discussed in this work, it seems that deriving the special properties of coronals from their representation involving the element 'A' is not impossible. Recall that among the resonance elements it is 'A' which exhibits special characteristics too, pointing, in some cases, to its recessiveness comparable to the behaviour of coronals. For example, in the analysis of the vocalic system of Irish we found that this element must in some contexts be supported in order to be licensed in a given position (compare e.g. [sp´el´ə] "scythe-gs." and [f´ir´] "man-gs."). Likewise, in Uyghur, the element 'A' tends to be unlicensed unless some clearly defined conditions are fulfilled (Denwood (1993)).

All this does not constitute unassailable evidence pointing to a particular solution but the facts suggest that at least the alacrity with which the coronal consonants undergo place assimilation can be explained in a fairly straightforward fashion, namely, by referring to the licensing constraints governing the interaction of 'A' with other elements. As this work does not aim to settle the discussion on coronality but rather attempts to present some predictions

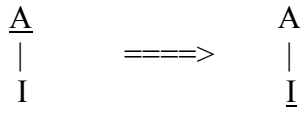
of a particular approach, we shall now turn to the discussion of the behaviour of I-A coronals with respect to palatalisation.

The first issue which appears to be troublesome concerns the following question: If coronality is represented as a combination of 'A' and 'I' should we not expect all coronals to be palatalised? Drawing on the parallel situation in vocalic systems we may, however, understand this compound in a slightly different way. Namely, since the elements 'I' and 'A', which in isolation define [i] and [a] respectively, form an altogether different quality [e] by combining with each other, then perhaps one could expect that the combination (I.A) in consonants does nothing but define coronality in which case the typical qualities of active 'I' may be suspended (the sporadic cases where these qualities show up in non-palatalised environments were mentioned above, e.g. the fronting of low vowels in Cois Fhairrge). The obvious question that should be asked now is how to obtain a palatalised coronal out of a non-palatalised I-A compound?[72]

It appears that the way of understanding coronality advocated here would restrict the possible ways of viewing secondary or primary palatalisation to a considerable degree. Namely, the palatalisation of coronals would have to be represented either as a shift in status of the two elements defining coronality, or by decomposition of the compound. In both instances, the aim of the operation is for the element 'I' to act independently of 'A' regardless of its status. The first possibility is illustrated below.

(59)

switch in status



This development may be followed by other effects depending on the parameter settings on the A-I interaction existing in a given system. Recall that in Irish the palatalisation of [r] and [s] results in decomplexification[73] to a contour structure due to parameter barring (A.I).[74]

Let us now consider the logically possible types of (I.A) decomposition.

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[72]Note that the same problem arises with a vengeance in models which assume coronality to be defined only by 'I' (cf. Lahiri and Evers (1991), Smith (1988)).

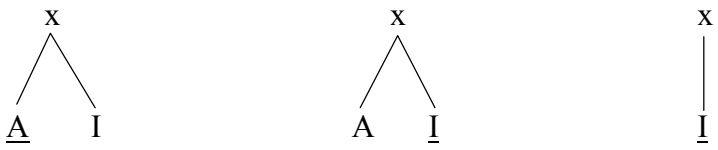
[73]This term is used with respect to affrication in, for instance, Harris (1990a).

[74]One might expect A-suppression in such systems too. Recall that the Donegal [r´] is pronounced as [j].

(60)

coronal decompositions

a. b. c.



Type ((60)a) illustrates a situation in which the status of the elements is unchanged, i.e. 'A' still acts as the head while 'I' is the operator. The difference is that 'I' acts as a separate unit now. One should hasten to add that such a type of decomposition, as a process, would have to be triggered by something independent of the conditions on A-I combination because a fusion of these elements is licit and hence expected. Thus, one might want to assume that in a language which allows (I.A) compounds the decomposition illustrated by type ((60)a) is improbable (see however the Polish situation below).

On the other hand, types ((60)b) and ((60)c) are more plausible as it is likely that a language which allows for (I.A) combinations might not have (A.I) compounds. In such a system the decomposition of the type ((60)b) and ((60)c) is not only logical but also follows straight from the fact that *(A.I) is illegal. This is exactly what we find in Irish in that, for instance, the palatalisation of [r] yields the structure ((60)b), i.e. [r´] in Munster, while in Donegal the palatalisation of [r] yields a [j] fricative ((60)c).[75]

Thus it follows from this model that palatalisation of coronals which are represented as a I-A combination can only be obtained through decomposition of this compound. The type of coronal decomposition is strictly determined by the licensing constraints defining the possible I-A relations in a given system. In other words, our representation of coronal consonants enforces a very restricted view on what palatalisation of coronals can be. We will see below that this model has other built-in advantages.

In the case of Irish, the restrictiveness of this model lies in the fact that only one type of palatalisation is allowed in this class of consonants. Namely, 'I' must become the head.[76] In other words, the contrast between palatalised vs. nonpalatalised (coronal) objects may be

[75]These facts are discussed at length in the previous sections.

[76]Recall that Polish has different parameter settings viz. (A.I) and not *(I.A).

expressed in one way, namely, by I-headedness. This follows from the structures ((60)b) and ((60)c) as well as from our observations of Munster palatalisation (e.g. [r]>[r´] and [s]>[ʃ] (4.4)). However, the question is if the same is true of the rest of Munster palatalised coronal consonants, i.e. [n´], [l´], [t´] and [d´]. Let us look at the pair [d]/[d´].

(61)

Recall that Irish is an "h-less" language, hence the segmental break-up into a contour segment can not produce an affricate. Thus the headedness of 'I' may be accepted as the only way in which the contrast among coronal consonants can be represented, due to the parameter settings defining A-I combinations in this language. However, one need not necessarily assume that the palatalisation of labials or velars should be effected in the same way, as the requirement concerning the A-I interaction is not present in these classes for obvious reasons. Namely, labial consonants are U-headed, while velars are empty headed (headless). In the latter case, however, one could still expect that the effect of palatalisation will result in I-headedness, since parallel to the vocalic system, the element 'I' should affect headless objects as the head. If that happens, then a few aspects of Irish phonology will be accounted for.

First of all, we will be able to correlate the effects of the lenition of voiced palatalised coronal and velar plosives. Both objects yield a fricative [j], i.e. an I-headed glide. Thus, if both palatalised objects are I-headed, then the result of their lenition is not surprising. Second, if the contrast between palatalised velars and coronals is brought about by the presence of the element 'A' in the latter series, then this fact might shed some light on the absence of A-suppression in e.g. palatalised [r´] and [d´], as well as explaining why Irish has a two-way contrast with respect to the palatalisation of coronals. The answer is that objects headed by 'I' define palatalised velars. Let us now see if a similar assumption concerning the representation of coronals as I-A can be applied to the Polish facts.

4.4.4. **Palatalisation of "(I-A) coronals" as decomposition (Polish).**

First let us see if the proposal that Polish coronals are defined as (A.I) rather than (A) alone has any consequence on the distribution of high front vowels.[77]

(62)

[sɨn]	*syn*	"son"	*[sin]
[tɨ]	*ty*	"you"	*[ti]
[dɨm]	*dym*	"smoke"	*[di]

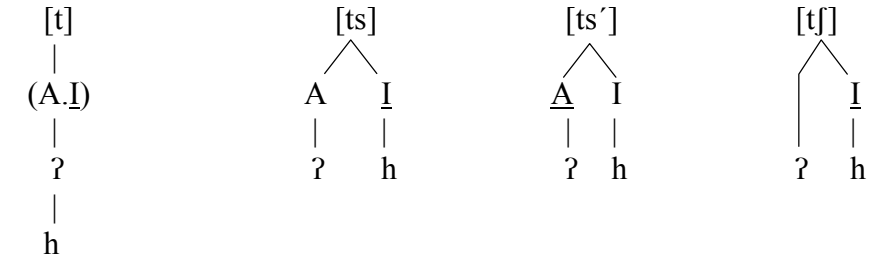
The forms above demonstrate that the non-palatalised coronals pattern with I-headed objects such as [tʃ], e.g. [tʃɨtam] *czytam* "I read", or [ʒ] e.g. [ʒɨts´e] *życie* "life", with respect to high front vowel distribution. Recall that the two Polish vowels [i] and [ɨ] differ in terms of distribution in C-V contexts in that [i] can follow a palatalised onset while [ɨ] occurs after non-palatalised ones and palatals e.g. *pytać* "ask", *dym* "smoke", *czytać* "read". With regard to the element status we found that [i] is represented as (I) and is preceded by an onset containing 'I' as an operator, while [ɨ] is defined by (I._) and may follow a I-headed object or one with no 'I' element. In a nutshell, we may say that the restrictions do not allow for a sequence of two elements 'I' enjoying the same status. In this respect, as shown above in ((62)) we may safely assume that the non-palatalised Polish coronals are defined by a (A.I) compound, and that these coronals will only differ from Irish non-palatalised coronals in the status of their elements.

Let us now consider the ability of Polish coronals to decompose. Just as with the Irish facts, we will accept as given that one way to palatalise such an object is to reverse the status of the elements 'I' and 'A'. Recall that in Irish this is the only way to represent the contrast between palatalised and non-palatalised coronals. Since 'A' does not license operators in Polish, the following types of coronals are made possible by the system (the tone element is ignored).

[77]It should be borne in mind that Polish has a different parameter setting from Irish concerning the interaction of 'A' and 'I'.

(63) *coronal* (A.I) *coronal decomposition*

a. b. c. d.

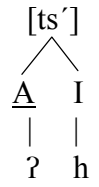


Let us look at these structures from the point of view of A-I interaction. Structure ((63)a) defines coronal consonants which are I-headed in Polish. Thus, similarly to (I.A) systems like Irish, the palatalised reflex of a Polish coronal requires a switch in status, as only then can the element 'I' act independently and contribute its palatal quality. In Polish we seem to have three possibilities, which neatly dovetail with the three-way contrast with respect to palatalisation. In this respect structures ((63)a) and ((63)b) may be assumed to be identical in that only decomplexification of the elements involved takes place (without a switch in status). These objects, i.e. ((63)a) and ((63)b), pattern in the same way with respect to high front vowel distribution, e.g. [t~~i~~] "you" and [ts~~i~~gan] "Gypsy". Of the remaining two structures, ((63)d) is headed by 'I', which is the only resonance element in such objects. On the other hand, ((63)c) illustrates the switch in status of the elements 'I' and 'A' to the effect that 'I' becomes the operator and 'A' is now the head. Let us take a closer look at this development.

It seems that the demotion of 'I' to the operator position is effected by the C-V harmony which operates in Polish. Recall that the element 'I' must not enjoy the same status in the onset and the following nucleus. This could be accounted for in terms of the OCP in that when an I-headed coronal is followed by an I-headed nucleus, then this element has to switch to the operator position in the onset. This, in turn, entails a break-up of the elements 'A' and 'I', as the element 'A' which took over the headship does not license operators. As a result of this break-up the elements form a contour structure which in an "h-ful" language like Polish yields the affricate [ts´] or the fricative [s´]. Note that both objects are followed by [i].

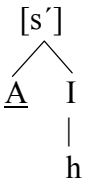
(64)

a.



[ts´iχo] "quiet"

b.



[s´ito] "sieve"

There are a few quite gratifying consequences of defining Polish coronal consonants as a combination of 'I' and 'A'. First of all, this proposal grants the licit Polish compound (A.I) its place in the consonantal system, an outcome which is quite welcome for any model which strives to equate the vocalic and consonantal systems in terms of their phonological representation and behaviour. Thus using only (A) or nothing to define coronality would inevitably produce a serious gap between the two systems.

Another advantage of this approach is that it offers a fairly restricted model of coronal palatalisation - as decomposition - and allows for a direct correlation between palatalisation and affrication, for example, *[ti] > [ts´i]. On the other hand, the affrication of [k] to [tʃ] where a headless combination (ʔ.h._) becomes I-headed (ʔ-h.I) requires more study as what seems to be at issue here is the interaction between 'I' and consonantal (manner) elements.[78]

Finally, one might wish to account for the lack of palatalisation of [r] in Polish, where [r] clearly contrasts with [ʒ] rather than with [r´] as in Irish.[79] Note that [r] should behave like [s], which has a palatalised counterpart [s´], as well as a palatal one [ʃ]. Given that [r] is defined as (A.I) there is no reason why it should not follow the pattern of other coronals. One possible way round the problem is to postulate that Polish [r] is in fact composed only of (A). Hence it can only contrast with the I-headed [ʒ].

In a sense this interpretation strengthens our proposal that (A.I) defines coronality. Note that a uniform representation of coronals as (A) would predict uniform effects of palatalisation when followed by an I-headed vowel. On the other hand, the prior presence of 'I' in coronals, except [r], ensures that no element is added to the coronal object, hence [r] is retained. Additionally, one must admit that an addition of 'I' to an A-headed object is not the

[78] See, for example, the discussion of this problem in Szigetvári (1996).
[79] Or Russian e.g. [r´eka] "river" vs. Polish [ʒeka].

most expected course of action in a language in which 'A' does not license operators.[80] This interpretation tallies also with the general assumption made here that palatalisation of coronals is a decompositional rather than compositional process.

Let us reiterate the effects of status switching within coronals in Irish and Polish and see how this phenomenon relates to the number of contrasts that these objects may exhibit. As argued earlier, in Irish, the switch is necessitated by the need to represent the contrast between palatalised and non-palatalised coronals. Recall that mere I-headedness is unavailable to Irish coronals as it defines palatalised velars (stipulation). The rest follows from the representation of Irish coronals, namely, from the possible ways of representing independent palatality.

In Polish, the switch is induced by the Consonant-Vowel harmony which disallows two elements of identical status within the Onset-Nucleus licensing domain. It should be stressed that both in Irish and in Polish the switch involves the emergence of an illicit combination, i.e. one which is not allowed by the existing parameters on element combination. In Polish, this phenomenon has clearly observable consequences, as we are dealing with an "h-ful" language, in that the impossibility of fusion is reflected in affrication. On the other hand, Irish, being an "h-less" language, does not exhibit such effects.

Thus the I-A representation of coronality imposes a very restricted view on palatalisation of such objects and provides us with a direct account of affrication which is understood as an interaction between the licensing constraints defining licit element combinations and other conditions on phonological structure in "h-ful" languages.

As far as the English system is concerned one thing is clear: neither palatalisation nor C-V harmony plays such a prominent role in the language, which has certain consequences. What we would expect is that neither of the motives given above for switching is available to English phonology. Therefore, the three-way contrast, e.g. [s]-[s´]-[ʃ], predictably, will not be found in this language. The question now is how to represent the English coronal objects as regards A-I interaction.

One might assume that English is, in fact, similar to Polish except that the absence of C-V restrictions in the former does not produce an object which would correspond to Polish

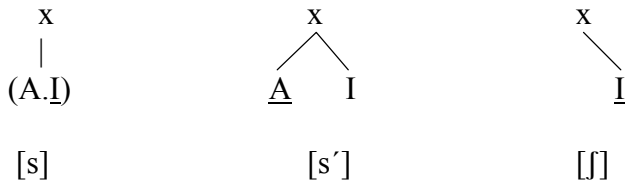
[80]One might exploit this interpretation and propose that the Russian palatalisation of [r] is in fact due to the presence of the element 'I' in that object.

[s´]. However, the marginal emergence of the English affricates [ts] and [dz] might suggest that the contrast between [t] and [tʃ] or [s] and [ʃ] is represented by (A) in a non-palatalised series and (I) in the palatal one. This would agree with our account of the Polish [r]-[ʒ] contrast as opposed to Russian [r]-[r´]-[ʒ].

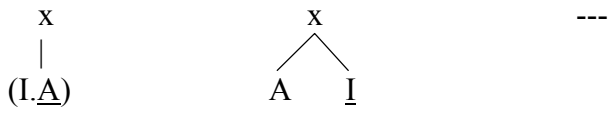
Below we illustrate the three systems in terms of I-A relations. It will be recalled that such consonantal systems are additionally defined by the "h-parameter". Since the structures of affricates are similar to those of fricatives in our analysis, we will use the latter to illustrate the types of objects that the structures represent.

(65)

Polish



Irish



English

In this model, affrication of coronals is conditioned in two basic ways: a) the system must have palatalisation effects due to C-V interaction which enforce element switching and b) the obstruents must have 'h'. It seems that Polish fulfils these conditions with a vengeance. Irish does not fulfil the second condition and is therefore deprived of affricates. English, on the

other hand, having very little interaction between consonants and vowels, possesses a rather scanty system of affricates.

4.4.5. **Summary**

To conclude, in this chapter we looked at the phonological behaviour of vocalic elements I-U-A in consonants. The central notion that was emphasised in the analysis of the Irish consonantal system was the headedness of resonance elements. The first case which suggested that these elements exhibit similar properties was that of the distribution of Irish [r] with respect to palatalisation. We claimed that the representation of this consonant as the headed element 'A' accounts for the manner of articulation of Irish [r] as a fricative, as well as for its resistance to palatalisation. The latter phenomenon is correlated with the behaviour of "opaque" (A-headed) vowels in Munster Irish with respect to palatalisation.

Additionally, we extended the observation that the headedness of 'A' corresponds to spirantisation to other fricatives (e.g. [v] = (U)). This, together with the parameter on the occurrence of the noise element ('h'), allows us to capture the absence of voice contrasts among the class of Irish fricatives. The 'h-parameter' may additionally be used in accounting for the absence of affricates in a given linguistic system. Interaction between 'h'-parameter and headedness has the potential of clarifying such historical processes as rhotacism and the shift [w]>[v] in e.g. Slavic.

Finally, we investigated the interaction of the elements 'I' and 'A' in Irish and Polish and proposed tentative representations for coronal consonants in the two languages which involve the elements 'I' and 'A'. The actual combination of the two elements is dependent on the parameter settings (licensing constraints) present in a given language. Therefore the representation of Polish coronals is I-headed, i.e. (A.I), while in Irish it is A-headed (I.A). Such a representation of coronal consonants in general imposes a restricted view on the palatalisation of these objects. We propose that palatalisation of coronal consonants involves decomposition of the compound I-A into a contour structure.

Although the proposals concerning the representation of coronals are of tentative nature, they clearly show that the assumption concerning the uniform behaviour of elements in vocalic and consonantal systems may be fully borne out.

Conclusions

The presence of resonance elements in the representation of vowels and consonants is one of the central claims of Government Phonology. This suggests the possibility that if we are dealing with the same objects (I-U-A), which only differ with respect to their syllabic position, i.e. whether they are syllabified in the onset or the nucleus, then we should expect the same type of phonological phenomena in the vocalic as well as the consonantal system. This work demonstrates that the general expectations are by and large borne out, and explores the consequences of the uniform representation for vowels and consonants.

In order to test the initial intuitions the study begins with an analysis of the vocalic system by looking at alternations effected by the consonant-vowel interaction. It turned out that what we are dealing with is an interaction between the vocalic elements I-U-A which are spread into nuclei, where the spreading proceeds not so much from consonants as from places which we defined as sharing domains (onset-nucleus relations). Given the existence of element spreading into nuclei from the right-hand side sharing domain as well as the fact that these nuclei share their own element 'I' or 'U' with the preceding onset, a wide range of phonetic realisations are exhibited which, paradoxically, define a very small number of contrasts.

An important factor in understanding the nature of element interactions in Irish was the establishment of parameters on element combinability in Irish, i.e. licensing constraints. This in turn was connected with the establishment of the status of elements in nuclei with respect to their interaction with elements which spread from the right. The head / operator division allows us not only to formulate the licensing constraints but also to account for the "immune" short vowels which we define as headed. The most important parameter on element combination in Irish is that the element 'I' does not license operators. This means that, for instance, the representation of the Irish vowel [e] must be A-headed (I.A) rather than I-headed *(A.I). This parameter allows us to account for such phenomena as A-suppression,

i.e. the impossibility of an I-headed nucleus to license the element 'A' as per the licensing constraint mentioned above.

It was encouraging to discover that the same pattern of behaviour is found in the system of long vowels, which, in the end, led us to propose that Irish long vowels are not subsumed under a branching nucleus, but rather form a sequence of nuclei with a fused melody. The immunity of most such vowels to "consonant-vowel" interaction may be ascribed either to their headed nature, parallel to immune short vowels, or to certain structural devices. Namely, a sequence of nuclei which is separated by a positionless onset may be viewed as a structure which is more resistant to phonological processing. However, this question is left open to further investigation. It must be emphasised though that the fact that Irish long vowels are not subsumed under a branching nucleus weakens the empirical power of binarity which is one of the central claims in Government Phonology.

Finally, it was necessary to test the established parameters with respect to the resonance elements present in consonants. Since the main emphasis was put on the interaction between 'I' and 'A' in the Irish vocalic system, mainly due to the less spectacular nature of the effects of U-spreading, we concentrated on the possibility that the grammaticality of the compound (I.A) has its counterpart in the representation of certain consonants. By analysing the behaviour of Munster [s] and [r] we established that coronal consonants may be defined as a headed (A). This assumption proved particularly useful in the analysis of the distribution of [r]'s in Munster with respect to palatalisation. Here too, the head / operator division allowed us to account for the resistance of [r] to palatalisation and especially for the different phonetic realisations of [r] as a trill or a flap depending on whether it was headed or not.

Additionally, the head / operator distinction helped us to establish the phonological representation of Irish fricatives and to propose a parameter governing the occurrence of the noise element 'h' in linguistic systems. This parameter may account for the absence of distinctive voicing among fricatives as well s for the presence or absence of affricates in a given system. Thus, for instance, Irish is an 'h-less' language, hence it will have no distinctive voicing among the class of fricatives, and will not have affricates in the system. On the other hand, Polish, which is an 'h-full' language, exhibits both features. The 'h-parameter' has to be further investigated as it offers some promising possibilities. One possible prediction that this

parameter entails is the unification of such seemingly unrelated historical processes as the rhotacism of [s] to [r] and the voicing of [s] to [z] as instantiations of a single process, namely, the delinking of the tone element 'H'. In addition to that, by referring to headedness as a possible way of defining friction allows for a better understanding of such historical processes as the shift [w]>[v] found in e.g. Slavic.

However, the proposal that, for example, Irish and Polish are differentiated by the occurrence of 'h' (the noise element) does not explain why Polish coronals exhibit a three-way contrast with respect to palatalisation while Irish and English possess only a two-way contrast in this respect. What is more, the definition of Irish coronals as (A) does not explain why the licit combination (I.A) is not found in the consonantal system of that language. Similarly, although the three-way contrast in Polish could easily be accounted for by employing (A) to mark coronality, the licit (A.I) compound is still missing (note that the parameters on I-A interaction are different in the two languages). This led us to the conclusion that perhaps coronality should in fact be defined as I-A, while the actual type of relation, i.e. I-headed or A-headed, is language specific.

Such a view of the representation of coronality in general imposes restrictions on what a palatalised coronal may be. Specifically, if the presence of 'I' in coronals does not entail phonetic palatalisation, the only possible way to represent palatalisation of coronals is to decompose I-A so that the element 'I' can act independently, be it as the head or the operator. It is interesting that some sort of decomposition is also found in the vocalic system of Irish which is the result of the interaction between vocalic elements in the (O)nset-(N)ucleus licensing domain. Similar restrictions involving (O-N) have been observed in the distribution of Polish high front vowels, which depends on the status of the element 'I' in the preceding onset.

Finally, we proposed tentative representations for Irish, Polish and English coronals which appear to reflect their distribution with respect to the decomposition of I-A. As we showed, this decomposition may sometimes result in an illicit combination, i.e. one in which the status of the elements I-A does not correspond to the parameter settings in these languages. We also demonstrated that this decomposition is highly conditioned by the Onset-Nucleus interaction in the case of Polish and the necessity to represent the palatalised / non-

palatalised contrast in Irish, while no such phenomenon occurs in English as both types of conditioning are absent from this language.

A broader analysis of coronality, especially in the context of other proposals such as those involving under- or non-specification of this class to capture its special status, was not possible within the format of this work and has to be reserved for future study. However, in the light of the analysis presented in this book, it seems prudent to assume that there is no such thing as a uniform or universal representation of coronality. As we saw above, it can be represented as (A.I) in Polish, (I.A) in Irish and just (A) in English. Additionally, we may expect a degree of variation within one system, for example, Polish [r] seems to have only (A) while the coronal nasal [n], which participates in place assimilataion, is probably best understood as non-specified for place.

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