3 Consonant clusters in Old Irish - governing relations between segments

3.1. Introduction – Old Irish consonant clusters

In this chapter we will survey consonant clusters occurring in the phonological systems of Old Irish and its predecessors. These consonantal sequences surface in word-initial, medial and final position. The chief aim of the following discussion is to shed some light on the canonical shape of the Old Irish word, to detect the irregularities and to propose a suitable explanation. Although establishing the sonority profile of consonant clusters is not a particularly complicated task, the governing relations between the segments constituting consonant groups are far from being clear. Two problems will receive special attention.

The first is connected with the question of why some left-hand members of word-initial clusters undergo lenition in a historical weakening context, similarly to single consonants discussed in Chapter Two, while others do not. Consider the following examples showing single stops and clusters in lenition contexts:

(1) a.	***Radical consonant***	***vs.***	***Lenited consonant***	
	[k^{i}eN] *cenn*	vs.	[ə ˈχ^{i}eN] *a chenn*	– ‘head’/‘his head’
b.	***Radical cluster***	***vs.***	***Lenited cluster***	
	[klaNd] *cland*	vs.	[iN ˈχlaNd] *in chland*	– ‘family’/‘the family’

The initial stops in clusters like [kl] undergo regular lenition in (1b), similarly to the single stops in (1a). However, initial segments in clusters composed of *s*+ stop are not lenited, e.g. [s^{i}k^{i}eːl] *scél* vs. [ə ˈs^{i}k^{i}eːl] *a scél* – ‘story’/‘his story’, although the single [s] is regularly weakened to [h], e.g. [suθ] *suth* vs. [ə ˈhuθ] *a suth* – ‘offspring’/‘his offspring’.

The second issue concerns apparently similar word-final clusters which were treated in dissimilar ways by the mediaeval Irish poetry and which developed in different ways after the period of Old Irish. For example, the sonorant+stop cluster [Lt], e.g. [foLt] *folt* – ‘hair’, which has remained unchanged until the present day, was perceived as metrically different from other sonorant+stop groups such as [Ld], e.g. [m^{i}eLd] *meld* – ‘pleasant’ and [lg], e.g. [bolg] *bolg* – ‘belly’. Subse-

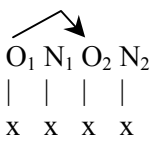
quently, the latter two also developed in different ways. Below the relations are represented schematically, a detailed discussion will follow later in this chapter.

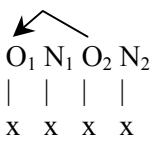
(2) a. ***Metrical treatment*** [lg] = [Ld] [lg] ≠ [Lt] [Ld] ≠ [Lt]

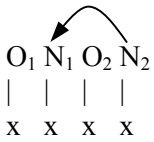
b. ***Subsequent development*** [lg] → [ləg] [Ld] → [L] [Lt] → [Lt]

(2a) shows that the clusters [lg] and [Ld] were treated by the verse in the same way, as opposed to [Lt]. After Old Irish, all these three types developed in three different ways (2b): [lg] was split by an epenthetic vowel, i.e. [ləg], [Ld] underwent simplification to [L], while [Lt] remained unchanged. Below it will be argued that these developments began as early as in Old Irish because these consonant clusters had three diverse structures already in that phonological system.

As a result of adopting a theoretical model in which there are no branching constituents and each non-nuclear position is followed by a nuclear slot, the only uncertain thing is the presence or the absence of governing relations between consecutive consonants. The presence of a relation can be discovered only due to a phonological analysis because both interonset relations and Proper Government can produce phonetic consonant clusters. The interonset relations will be referred to as Interonset Government (IO). Thus, formally, we have three possible structures of consonant clusters:

(3) a. 

b. 

c. 

In (3a) we can see a head-initial governing relation holding between the governor (O_1) and the governee (O_2), e.g. stop+liquid [tr, pl]. In such a relationship the governor must be elementally more complex than the governee. The intervening nucleus is silent because the IO relation allows it to remain mute. In the structure in (3b) the government is head-final, the governor (O_2) is stronger than the governed segment (O_1), e.g. liquid+stop [rt, lp]. Here also (N_1) remains inaudible thanks to IO. In (3c) an IO relation between (O_1) and (O_2) cannot be established for whatever reasons. There are two fundamental criteria which determine the presence or absence of IO. One is that the substantive complexity of cluster members does not allow them to contract IO. The other is that the nucleus which follows a cluster is prosodically too weak to license a potential IO relation. Under such circumstances, the nucleus (N_1) can remain mute only if it is properly governed by (N_2).

The relations between the participants of these exemplary clusters cannot be taken for granted, however. Although all the clusters from (2) seem to belong to type (3b), their behaviour in Old Irish and subsequent developments indicate that this need not be so. By the same token, the cluster [kl] from (1b) looks like a typical representative of type (3a). Nonetheless, its behaviour in leniting contexts may indicate a different interpretation.

Apart from word-initial and final consonant sequences, also medial clusters will be analyzed in this chapter. The analysis of the abovementioned structures will be prefaced with a selection of relevant data and a theoretical introduction.

3.1.1. Word-initial consonant clusters

In this part the inventory of word-initial consonant clusters will be provided. We will see context-free clusters as well as combinations occurring only in morpho-syntactically-conditioned initial-mutation environments. The former clusters will be referred to as 'radical', while the latter as 'mutated'.

3.1.1.1. Radical word-initial consonant clusters

First, consider an exhaustive inventory of radical clusters along with some representative cases. Sequences of obstruents followed by lax liquids are listed below:

(4) OBSTRUENT (OR m)+LAX LIQUID

pr	br	tr	dr	kr	gr	fr	mr		pl	bl	tl	dl	kl	gl	fl	ml
[bʲrʲiθʲəv̂]	*brithem*	– 'judge'						[dʲlʲiɣʲəð]	*dliged*	– 'law'						
[kʲrʲiðʲe]	*cride*	– 'heart'						[klaðʲəv]	*claideb*	– 'sword'						
[mruɣʲ]	*mruig*	– 'land'						[fʲlʲesk]	*flesc*	– 'wand'						

Let us note that all the stops present in the system of Old Irish can be followed by both lax liquids, that is [r] and [l]. Moreover, the only fricative preceding [r] and [l] is [f]. Finally, [m] patterns with the stops and [f] in that, unlike other sonorants, it can be followed by these liquids.

The next set comprises stops followed by the lax nasal [n]. This set is much more restricted since there is a systemic absence of the potential clusters [pn, bn, dn, fn, mn]. Let us also note that no fricative can precede [n] word-initially.

(5)

STOP+n		tn	kn	gn
[tnu:θ]	*tnúth*	– 'rage'		
[knuː]	*cnú*	– 'nut'		
[gnu:sʲ]	*gnúis*	– 'face'		

The set below contains the sequences of [s] followed by the tense sonorants. Note that [s] is the only segment which can precede the tense sonorants in word-initial position.

(6) s+TENSE SONORANT sL sR sN

[sLoːɣ] *slóg* – 'army'
[sRuθ] *sruth* – 'stream'
[sʲNʲeχte] *snechtae* – 'snow'

The voiceless fricative [s] followed by voiceless stops or [m] constitute the next group. Let us note that the labial nasal patterns with the voiceless stops since no voiced stops occur in this position.

(7) s+VOICELESS STOP OR [m] sp st sk sm

[sʲpʲirəd] *spirut* – 'spirit' [skaːθ] *scáth* – 'shadow'
[storʲ] *stoir* – 'history' [sʲmʲeχ] *smech* – 'chin'

Finally, let us consider triconsonantal sequences composed of [s] followed by voiceless stop+lax liquid clusters. These are the only word-initial ternary groups found in Old Irish. As mentioned in Chapter Two, it is sometimes difficult to state precisely if all of these were part of the Irish inventory as early as in Old Irish. Most probably those with [t] and [p] are quite late borrowings.

(8) s+CLUSTER (VOICELESS STOP+LAX LIQUID) spr ? spl ? str ? skr skl

[sprog] *sproc* – 'fear'
[sʲkʲlʲeo] *scléo* – 'sorrow'
[sʲkʲrʲed] *scret* – 'scream'

What is shown in (4-8) is an exhaustive list of possible word-initial consonant sequences in the system of Old Irish. This division of radical clusters into five groups becomes evident if we look at the inventory of consonantal combinations in mutation contexts.

3.1.1.2. Word-initial clusters in leniting contexts

First, let us consider the possible clusters in lenition contexts. The first set shows the lenited versions of clusters from the group in (4), that is obstruents followed by the lax liquids.

(9) FRICATIVE+LAX LIQUID fr fl vr vl θr θl ðr ðl χr χl ɣr ɣl v̂r v̂l

Radical	***Lenited***		
[brat]	[ə ˈvrat]	*bratt/a bratt*	– ‘cloak’/‘his cloak’
[dluɣ]	[də ˈðluɣ]	*dlug/do dlug*	– ‘claim’/‘your claim’
[klaNd]	[iN ˈχlaNd]	*cland/in chland*	– ‘family’/‘the family’
[graːn]	[mə ˈɣraːn]	*grán/mo grán*	– ‘grain’/‘my grain’
[mraθ]	[ə ˈv̂raθ]	*mrath/a mrath*	– ‘treachery’/‘his treachery’

We should observe that all the initial stops from (4) above (including [m]) are turned into the corresponding fricatives in a leniting context. The liquids remain unchanged. The fricative [f] disappears and the radical clusters [fr] and [fl] are realized as [r] and [l], respectively. In other words, they are no longer clusters.

Now let us observe the behaviour of clusters from (5), namely stops followed by [n], in a leniting environment.

(10) FRICATIVE+n θn χn ɣn

Radical	***Lenited***		
[tnuːθ]	[ə ˈθnuːθ]	*tnúth/a thnúth*	– ‘rage’/‘his rage’
[gʲnʲiːv̂o]	[iN ˈɣʲnʲiːv̂o]	*gnímo/in gnímo*	– ‘of a deed’/‘of the deed’

In this group the original stops from (5) are also turned into the corresponding fricatives similarly to those in (9). The lax nasal remains unaltered.

The group in (11) below is a lenited version of *s*+tense sonorant clusters presented in (6) above.

(11) h+LAX SONORANT hl hr hn

Radical	***Lenited***		
[sLoːɣ]	[ə ˈhloːɣ]	*slóg/a slóg*	– ‘army’/‘his army’
[sRoːn]	[mə ˈhroːn]	*srón/mo srón*	– ‘nose’/‘my nose’

The *s*+tense sonorant sequences from (6) surface as *h*+lax sonorant clusters in a leniting environment in (11). The difference between these clusters and those in (9-10) is that the sequences in (11) display the replacement of two segments in the leniting environment, while in the previous two groups only the initial segments undergo changes.

The radical [s] followed by voiceless stops, e.g. [sk], or by clusters composed of voiceless stops and liquids, e.g. [skr], from (7-8) does not undergo lenition in a weakening context. A word of comment is in order here, however.

The cluster [sm] from (7) above, discussed in Chapter Two, is slightly problematic in that the phonological system of Old Irish treated it in two different ways, either as a non-leniting one or as a configuration which deleted the spirant, thus becoming [m] alone. By the end of Old Irish, though, the survivors, that is the items in which the whole cluster was preserved, *sm* came to be regarded as an invariably unlenitable *s*+stop group.[1] The same cannot be said about the initial dental spirant [s] followed by a sonorant in (6), e.g. [sN]. Although the details are discussed in Chapter Two, let us briefly recall that this initial fricative is transformed into [h] when it is preceded by a vowel (e.g. [sLoːɣ] *slóg* – 'army' vs. [mə ˈhloːɣ] *mo slóg* – 'my army'), or is replaced by [t] when it follows a leniting article ending in a dental nasal (e.g. [sRoθo] *srotho* – 'of a stream' vs. [iN ˈtroθo] *int srotho* – 'of the stream'). Both these changes are apparently accompanied by the exchange of the tense sonorant for a lax one. It should be made clear, however, that these assumptions are based totally on spelling. Thurneysen (1946:142) claims that in certain manuscripts a *punctum delens* (a raised dot above *ṡ*) was used in spelling, which might indicate the lenition of the dental fricative before sonorants, but this practice was highly inconsistent and this diacritic may have also been used even when unnecessary. Grijzenhout (1995:82-85) argues that the spirant was rather unlenited when preceding voiceless stops but does not mention the situation in front of sonorants. It is extremely difficult to decide what the situation was really like in Old Irish, but certain assumptions can be made. Taking into account the development of the Irish language and the fact that in Modern Irish initial clusters consisting of [s] followed by stops do not undergo lenition, while the same spirant preceding sonorants is lenited to [h], we may suppose that the status of this fricative was the same in Old Irish. In other words, [s] was lenited before all sonorants except [m].

The number of clusters found exclusively in leniting sites is by far smaller than that of radical groups occurring in non-mutating contexts. This is due to the fact that many combinations, i.e. those from (7-8) including [s] followed by voiceless stops, e.g. [sk], and clusters composed of voiceless stops and liquids, e.g. [skr], are immune to weakening.

[1] Nonetheless, Ó Siadhail (1989:112ff.) notes that in some Munster dialects the cluster [hm] occurs.

3.1.1.3. Nasalization of word-initial clusters

Now let us turn to the other mutation. Consider the consonant combinations occurring in nasalization contexts. The clusters in (12) are eclipsed versions of radical sequences from (4), while these in (13) reflect the groups from (5) above.

(12) VOICED OBSTRUENT OR NASAL+LAX LIQUID

br bl mr ml dr dl Nr Nl gr gl ŋr ŋl vr vl

Radical	***Nasalized***		
[brat]	[ə ˈmrat]	*bratt*/*a mbratt*	– ‘cloak’/‘their cloak’
[traɣʲiðʲ]	[ə ˈdraɣʲiðʲ]	*traigid*/*a traigid*	– ‘feet’/‘their feet’
[gʲlʲeN]	[ə ˈŋʲlʲeN]	*glenn*/*a nglenn*	– ‘valley’/‘their valley’

(13) VOICED STOP OR VELAR NASAL+n dn gn ŋn

Radical	***Nasalized***		
[tnuːθ]	[ə ˈdnuːθ]	*tnúth*/*a tnúth*	– ‘rage’/‘their rage’
[gʲnʲiːv̂]	[iNʲ ˈŋʲnʲiːv̂]	*gním*/*in ngním*	– ‘deed’/‘the deed’-acc.sg.

In the nasalizing contexts in (12) and (13) the radical voiceless stops from (4) and (5) surface as the corresponding voiced stops, while the radical voiced stops are realized as the corresponding nasals.[2] The second component of the cluster, that is the lax liquid in (12) and the lax nasal in (13), invariably remains unaltered. Note also that, due to eclipsis, a few peculiar clusters surface, e.g. [ŋl], [ŋn].

There is yet another cluster which occurs exclusively in a nasalizing environment, namely [mn]. This combination is found in the oblique cases and derivatives of [bʲen] *ben* – ‘woman’ whose gen.sg., nom.pl. and acc.pl.is [mnaː] *mná*.

Let us also note that *s*+consonant clusters from (6-8) above, e.g. [sk], [skr], [sL], are immune to eclipsis.

The aim of the brief discussion about lenition and nasalization contexts above was to indicate that the possibilities of consonant combinations are limited and that the occurrence of certain clusters is contextually conditioned. We will discuss the implications of this fact when analyzing word-initial clusters in detail in later parts of this chapter. The following section will be devoted to the presentation of consonant clusters occurring at the right-hand edge of words.

[2] The interpretation of the word-initial orthographic sequences *mb*, *nd* and *ng* as [m, N, ŋ] is based on Quin (1975:9), although it is possible to assume that they were realized as [mb], [Nd] and [ŋg], respectively.

3.1.2. Word-final consonant clusters

In word-final position consonants display combinations which are, in a number of cases, mirror images of what can be observed in word anlaut. The most typical combinations include sonorant+stop groups. Consider the possibilities below.

(14) LIQUID+STOP (INCLUDING m)

rp	rb	Rt	Rd	rk	rg	rm	lp	lb	Lt	Ld	lk	lg	lm

[korp]	*corp*	– ‘body’	[skalp]	*scalp*	– ‘fissure’
[borb]	*borb*	– ‘rough’	[skolb]	*scolb*	– ‘splinter’
[goRt]	*gort*	– ‘field’	[foLt]	*folt*	– ‘hair’
[aRd]	*ard*	– ‘high’	[m^{i}eLd]	*mel(d)*	– ‘pleasant’
[d^{i}erk]	*derc*	– ‘hole’	[olk]	*olc*	– ‘bad’
[d^{i}erg]	*derg*	– ‘red’	[bolg]	*bolg*	– ‘belly’
[gorm]	*gorm*	– ‘colour blue’	[salm]	*salm*	– ‘psalm’

The clusters in (14) comprise word-final stops preceded by liquids. These resonants are always lax, i.e. [r] and [l], when preceding non-homorganic stops, but invariably tense, that is [R] and [L], if they stand before homorganic obstruents. The labial nasal patterns with stops in this position, just as it does word-initially (see (4) and (9) above).

(15) NASAL+NOMORGANIC VOICED STOP mb Nd ŋg

[Loŋg]?	*long*	– ‘ship’	or	[Loŋ] ?	
[kamb]	*camb*	– ‘crooked’	also	[kam]	*cam(m)*
[klaNd]	*cland*	– ‘family’	also	[klaN]	*clann*

This set is slightly controversial in that sequences such as [mb], [Nd], and [ŋg] were on the wane during the period of Classical Old Irish to be simplified to sonorants alone in Late Old Irish or Early Middle Irish. In other words, it is not certain whether in Old Irish they were still clusters. In any case, it is worth noting that potential word-final sequences including these nasals followed by the homorganic voiceless stops, that is [ŋk], [mp] and [Nt], were practically absent from the system of Old Irish. Only the last of these can be found in function words, e.g. the definite article [iNt] occurred before the lenited [s] in the following word (see Chapter Two for details).

Now, let us consider another group of consonantal sequences representing the same falling-sonority profile, although now the word-final segment is the voiced labial fricative.

(16) SONORANT+ LABIAL FRICATIVE rv lv nv

[dʲelv] *delb* – ‘image’
[marv] *marb* – ‘dead’
[banv] *banb* – ‘piglet’

In (16) we can see the three lax sonorants [l, r, n] preceding the lenis labial fricative [v]. Apparently, this is the only spirant found in such a context.

Generally speaking, the combinations presented in (14-16) above belong to the type characterized by sonority falling to the right.

It seems proper at this point to note that the clusters in (14-16), although they appear to represent the same pattern, that is sonorants followed by obstruents, should not be treated in a similar fashion. There are two reasons for this. One is that as early as in mediaeval verse, some clusters were allowed to rhyme with each other whereas others were not, e.g. [korp] *corp* – ‘body’ was treated on a par with [olk] *olc* – ‘bad’, but not with [borb] *borb* – ‘rough’ (Greene 1952). The simplest cause of the differentiation seems to be the fact that the final consonant is voiceless in the first two cases, that is [korp] and [olk], but not in the third, i.e. [borb]. There are more complex sources of this distinction, however, and these will be discussed shortly. The other reason is even more important. In particular, the development of the language and the Modern Irish versions of some words show that there were three ways in which the clusters from (14-16) developed. These are schematized below:

(17)	TYPE	EXAMPLE		CHANGE	RESULT
a.	***Sonorant+voiceless obstruent***	[korp]	–	***no change***	
b.	***Sonorant+voiced obstruent***	[borb]	–	***vowel epenthesis***	→ [borəb]
c.	***Tense sonorant+ Homorganic voiced stop***	[klaN(d)]	–	***vowel lengthening or diphthongization***	→ [klauN]

These developments need not but may mean that in Old Irish the superficially parallel consonant clusters should be analyzed as dissimilar.

While being the most typical word-final clusters, the non-vocalic sequences above do not exhaust the combinatorial possibilities found in Old Irish lexical items. The much less frequent, although by no means marginal word-final clusters can be divided into three groups: (i) [ð] followed by a voiced obstruent or [m], (ii) a voiceless fricative preceding a voiceless stop, and (iii) two sonorants. Consider the following examples:

(18) VOICED DENTAL FRICATIVE+VOICED STOP (INCLUDING m) OR VOICED LABIAL FRICATIVE ðb ðg ðm ðv

[oðb]	*odb*	– ‘knot’ (rare cluster)	[maðm]	*madm*	– ‘breaking’
[taðg]	*Tadgg*	– a man’s name	[fʲeðv]	*fedb*	– ‘widow’

In these sequences the sonority slope between the cluster members is shallow or null. The labial nasal [m] patterns with stops in that it can occur finally following a fricative. Interestingly, the labial spirant [v] can follow a preceding fricative. The subsequent development of these sequences shows that they have not continued to exist in Modern Irish. By and large, they have been simplified to the final segment alone, which has been accompanied by the vowel diphthongization, e.g. [faib] *fadhb* – ‘knot of timber’, [taig] *Tadhg* – a man’s name.

The second minor group comprises fortis non-labial fricatives followed by voiceless non-labial stops.

(19) VOICELESS FRICATIVE+VOICELESS STOP st sk χt

[tʲesʲtʲ]	*teist*	– ‘testimony’
[Resk]	*resc*	– ‘talk’
[oχt]	*ocht*	– ‘eight’

In these sequences of voiceless consonants there are no exceptions in that no fricative can occur word-finally after another spirant. As regards the subsequent development, these clusters have survived into Modern Irish virtually intact, e.g. [iəsk] *iasc* – ‘fish’ and [riːχt] *ríocht* – ‘kingdom’.

Finally, let us consider a minor group of clusters composed of two resonants (the first one is extremely rare and the tenseness in the resonants is debatable).

(20) SONORANT+SONORANT RN nm

[doRN]	*dornn*	– ‘fist’
[anʲmʲ]	*ainm*	– ‘name’

In these sequences there seems to be no sonority difference between the cluster members. This is not surprising in the case of [m] which patterns with stops in that it can also follow liquids, e.g. [salm] *salm* – ‘psalm’, as well as the voiced fricative [ð], e.g. [maðm] *madm* – ‘breaking’. We follow Thurneysen (1946: 74ff.) in the interpretation of the orthographic sequence *rnn* as a cluster of two tense sonorants, although this combination is peculiar because [N] can follow no other consonantal segment word-finally. As far as the further development of

these clusters is concerned, words such as [doRN] and [anʲmʲ] have generally developed svarabhakti vowels and are in some dialects pronounced as [dorən] and [anʲimʲ], respectively (Ní Chiosáin 1999:560ff.).

In terms of metrical properties, the clusters from (18), e.g. [ðb] and those from (20), e.g. [nm], can rhyme with the more common sequences from (17b), e.g. [rb], and (17c), e.g. [Nd], in mediaeval verse (Greene 1952). As regards the clusters from (19), e.g. [χt], these can rhyme with the ones from (17a), e.g. [rp]. Apparently, the main criterion for such a division of word-final clusters seems to be the voicing of the final consonant. This observation will be verified soon.

The ensuing section presents word-medial consonant combinations, a number of which look similar to both word-initial and word-final clusters shown so far.

3.1.3. Binary sequences in word-medial position

Let us first consider word-medial clusters which exhibit the same sonority profiles as the groups occurring in word-initial position (either radical or mutated):

(21)	a. STOP+LAX SONORANT			b. FRICATIVE+LIQUID		
[eːdrom]	*étromm*	– ‘light’		[kʲelʲəvrəðʲ]	*celebraid*	– ‘bid farewell’
[egla]	*ecla*	– ‘fear’		[dʲiːθrəv]	*díthrub*	– ‘wilderness’
[kodləð]	*cotlud*	– ‘sleep’		[gʲiɣrəN]	*gigrann*	– ‘goose’
[egne]	*ecnae*	– ‘wisdom’		[aχrəN]	*achrann*	– ‘thicket’

The examples in (21) show clusters with sonority rising to the right and display either stops (21a) or fricatives (21b) followed by resonants. Such cases constitute a minor group in the language. In other words, few words conforming to this pattern can be found in this particular environment. Let us note that the sequences in (21b) are the expected outcomes of intervocalic lenition, while those in (21a) are not, because the latter do not display fricatives.

What is interesting about these Old Irish groups of medial clusters is that in some varieties of Modern Irish (e.g. Munster) the survivors show vowel epenthesis, e.g. [egla] and [aχrəN] are now realized as [agəla] and [aχərən], respectively (Doyle and Gussmann 1991:418; Green 2003).[3] In other words, we are currently dealing with a tendency to eliminate word-medial obstruent+sonorant sequences from the linguistic system of Irish.

A greater number of available items represent the reverse pattern, i.e. where sonority decreases to the right. Most of these combinations were presented when discussing word-final clusters in (3.1.2.). Consider a few cases below.

[3] Modern Irish clusters are also well-discussed in Ó Sé (2000).

(22) a. n/N +OBSTRUENT (INCLUDING m)

[b^{i}eNdəχt]	*bendacht*	– ‘blessing’	[in^{i}ɣ^{i}ən]	*ingen*	– ‘daughter’
[oiNtu]	*oíntu*	– ‘unity’	[m^{i}enme]	*menmae*	– ‘mind’
[aNse]	*ansae*	– ‘difficult’			

b. r/R +OBSTRUENT (INCLUDING m)

[oRdu]	*ordu*	– ‘thumb’	[karbəd]	*carpat*	– ‘chariot’
[k^{i}eRta]	*certa*	– ‘justice’	[argəd]	*argat*	– ‘silver’
			[forməd]	*format*	– ‘jealousy’

c. l/L +OBSTRUENT (INCLUDING m)

[daLte]	*daltae*	– ‘fosterling’	[t^{i}el^{i}g^{i}ið^{i}]	*telcid*	– ‘throw!’-2pl.
[maLdəχt]	*maldacht*	– ‘curse’	[albu]	*Albu*	– ‘Scotland’
[d^{i}i:L^{i}s^{i}e]	*dílse*	– ‘propriety’	[tulχəχ]	*tulchach*	– ‘hilly’
			[falmər^{i}]	*falmoir*	– ‘chest’

d. VELAR NASAL+VOICED VELAR STOP

[t^{i}eŋge]	*tengae*	– ‘tongue’
[iŋ^{i}g^{i}ən]	*ingen*	– ‘nail’

e. m+HOMORGANIC STOP

[im^{i}b^{i}əð]	*imbed*	– ‘abundance’
[t^{i}empəl]	*tempul*	– ‘temple’

f. VOICELESS FRICATIVE+VOICELESS STOP

[k^{i}esto]	*cesto*	– ‘question’-gen.sg.
[s^{i}N^{i}eχte]	*snechtae*	– ‘snow’
[tosko]	*tosco*	– ‘need’-gen.sg.

In the examples above we can see sonorants followed by obstruents in (22a-e). In (22a) the tense coronal nasal precedes the homorganic obstruent, either voiced or voiceless. The nasal is lax when it is followed by an non-homorganic obstruent, as in [in^{i}ɣ^{i}ən] *ingen* – ‘daughter’. In (22b) the liquid [r] is followed by stops or fricatives. It is worth noting that it surfaces as tense when preceding a homorganic consonant, as in [oRdu] *ordu* – ‘thumb’. (22c) shows the liquid [l] followed by stops or fricatives. Also here it should be noticed that the liquid is tense before homorganic obstruents, as in [daLte] *daltae* – ‘fosterling’. The velar nasal is followed by the homorganic voiced stop in (22d). In this interpretation we assume that the orthographic *ng* represents two segments, which need not be true but which cannot be proved either right or wrong at this stage. In (22e) the labial

nasal is followed by a homorganic stop. Finally, in (22f) voiceless spirants are followed by voiceless stops.

The list above, possibly not exhaustive, points to the existence of certain tendencies in the phonological system of Old Irish. The fact that words representing the pattern of falling sonority illustrated in (22) clearly outnumber those displaying the reverse order shown in (21) leads to the conclusion that a wider range of combinations are possible in word-internal consonant clusters provided that sonority decreases to the right.

A word or two should be said about the reasons behind the selection of consonant clusters offered in this section. There are a number of clusters in which vowel-zero alternations can be observed, e.g. [an$^{i}\breve{\text{v}}^{i}$e] *ainme* but [an^{i}i$\breve{\text{v}}^{i}$] *ainim* – gen.sg./'defect' or [enge] *encae* but [eNəg] *ennac* – gen.sg./'innocent'. Those have not been included in what was shown above because they represent a different group of cases which may be called syncopated. They include clusters which are not truly adjacent in all forms occurring synchronically in the phonological system. Other reasons and appropriate explanations will be offered whenever necessary. Now it is time we considered ternary clusters occurring in the middle of the word.

3.1.4. Triconsonantal word-medial clusters

In the final section devoted to the presentation of the relevant data connected with the possible combinations of consonants, sequences of three non-vocalic segments found in the middle of the word will be exemplified. It should be stressed that none of these combinations can be found in any other position. Let us recall (3.1.1.) that word-initially only *s*+voiceless stop+lax liquid sequences are allowed, while word-finally no ternary clusters occur in Old Irish. Consider the selection of data below.

(23)

a.	[taskni]	*:tas**cn**ai*	– 'approach'	(3sg. dependent form of *do:ascnai*)
	[m^{i}eskvəð^{i}]	*me**scb**aid*	– 'quarrel'	or *me**sb**aid*
b.	[s^{i}k^{i}r^{i}ivNd^{i}ið^{i}]	*scrí**bnd**id*	– 'scribe'	or *scrí**bd**id*
	[f^{i}r^{i}egNdər^{i}g^{i}]	*fre**cnd**airc*	– 'present'	or *fre**cd**airc*
c.	[kodəRsNe]	*cota**rsn**ae*	– 'contrary'	
	[taθ^{i}χ^{i}r^{i}ək]	*tai**thchr**ecc*	– 'redeeming'	(verbal noun of *do:aithchren*)

All the cases above contain peculiar sequences of consonants, many of which resulting from morphological complexity, and any attempt at discovering any type of regularity seems pointless at first glance. Nonetheless, some classification can

be made. Thus, the first two examples (23a) display *s*+voiceless stop clusters, which occur in all positions in a word, followed by another consonant, i.e. [sk]+[n] or [v]. Another two (23b) contain typical medial and final [Nd] preceded by [v] or [g]. The final two (23c) display [sN] and [χr], which are found word-initially and medially and which are preceded by another consonant, i.e. [R] and [θ], respectively. The list above is not exhaustive because triconsonantal clusters are anything but peculiar in Old Irish. However, what this selection shows is that in ternary clusters typical binary sequences are either preceded or followed by a single consonant and that no triconsonantal group violating this pattern occurs in the system, i.e. we do not discover sequences such as [bχs] or [sgm] for example. It is also noteworthy that some of the words above have simplified doubles, which may indicate that some sequences were perceived as less acceptable by the system than those which never display simplification.

In the remainder of this chapter a phonological analysis of clusters occurring in Old Irish as well as in the prehistory will be provided.

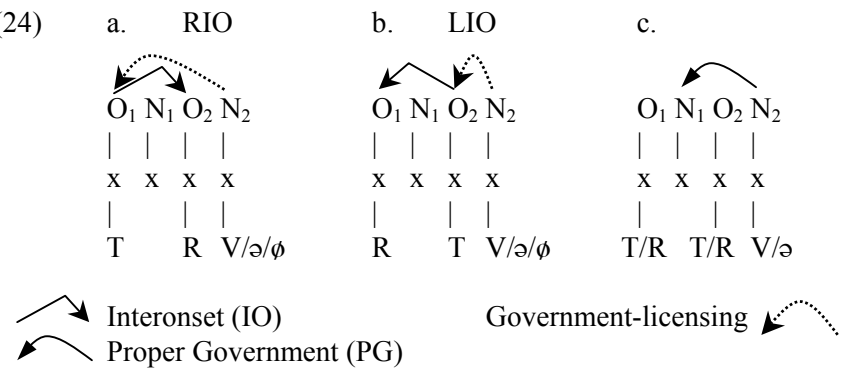
3.2. A GP analysis of consonant clusters

3.2.1. Introduction

In this part of the present chapter an attempt will be made to analyze the consonant clusters of Old Irish from the viewpoint of GP. Let us recall that our analysis is based on the assumption that all constituents, i.e. onsets and nuclei, are non-branching. Therefore, every binary consonant cluster is a sequence of two onsets separated by an empty nucleus while every ternary combination equals three onsets split by two intervening empty nuclei.

In formal terms, we distinguish three possible phonological representations of surface consonant clusters sketched in (3), and fully illustrated below. T stands for 'true consonants', R represents 'resonants', while V is a 'full vowel':

(24)



Following Cyran (2003), the structure represented in (24a), that is an interonset governing relation traditionally interpreted as a branching onset, will be referred to as RIO – rightward interonset relation, while the relationship shown in (24b), viewed as a coda-onset sequence in the mainstream GP, will be termed LIO – leftward interonset governing domain. In both cases the IO relations need to be licensed by the nucleus following the clusters, that is (N_2). In (24a) we also see indirect prosodic licensing, i.e. the licensing nucleus (N_2) does not immediately follow the governing onset (O_1), while in (24b) the licensing is direct because the licenser (N_2) is in the immediate neighbourhood of the IO governor (O_2). It must also be noted that both LIO and RIO license the intervening nucleus (N_1) to remain phonetically mute. The structure in (24c) illustrates the absence of an IO relation between the consecutive onsets and the intervening nucleus (N_1) is properly governed by (N_2). It is taken for granted that every onset is licensed by the following nucleus. This licensing is not marked in diagrams unless necessary.

The three configurations in (24) produce surface clusters of two consonants. However, it is possible that neither IO nor PG can be contracted. Let us recollect that, for IO to be held, two conditions must be met. First, there must be a complexity slope between the governor and the governee, i.e. the governor must be more complex (or, at least, not less complex) than the governee. Cross-linguistically, obstruents (T) are typical governors, while sonorants (R) and [s] are classic governees. Second, the nucleus which follows IO must be able to license this relation (Charette 1990; Cyran 2003). Depending on the phonological system, the government-licensing nucleus may be a full vowel (V), a schwa [ə] or an empty nuclear slot (ø). If either of these conditions is not fulfilled, an epenthetic vowel splits the cluster, i.e. the nucleus unlicensed by IO must be phonetically realized unless it can be properly governed. As regards Proper Government, the properly governing nucleus must contain a vowel. If this condition is not met, also an epenthetic vowel must surface between the cluster members.

3.2.2. The element representations of Old Irish consonants

Let us first consider the element structures of Old Irish consonantal segments, both radical and lenited, repeated below for convenience. The primes employed are: U – labial, H – voiceless, ʔ – stop, A-I – dental, N – nasal, @ – velar.

(25)

Fortis stop		***Fricative***		***Lenis stop***		***Fricative***	
p	(U, ʔ, H)	→ f	(U, H)	b	(U, ʔ)	→ v	(U)
t	(A-I, ʔ, H)	→ θ	(A-I, H)	d	(A-I, ʔ)	→ ð	(A-I)
k	(@, ʔ, H)	→ χ	(@, H)	g	(@, ʔ)	→ ɣ	(@)
				m	(U, ʔ, N)	→ ṽ	(U, N)

It is clear from the table above that the stops become corresponding fricatives and lose the stopness element when lenited. The other segments which can display strong or weak variants are as follows (the prime (A) stands for 'alveolar'):

(26)

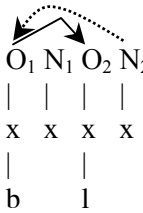
Fricatives			***Sonorants***			
s	(A, H)	→ h (H)	N	(A-I, N)	vs. n	(A-I, N)
f	(U, H)	→ ɸ	L	(A, ʔ)	vs. l	(A, ʔ)
			R	(A)	vs. r	(A)

For reasons specified in Chapter Two, only the spirants, that is [s] and [f], can be said to take part in the process of lenition. The sonorants do not undergo weakening. When in clusters, they simply display tense variants before coronal obstruents or after [s], while they surface as lax in the vicinity of other consonants. Therefore, there are no arrows (→) indicating the process of lenition in the case of resonants in (26). In the ensuing sections we will be using these element complexities with a view to discovering the presence or absence of interonset governing relations between segments.

3.2.3. Word-initial stop+sonorant sequences

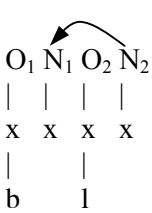
This section deals with stop+sonorant clusters found in word-initial position in Old Irish. Given that stops are classic governors while sonorants are typical governees, we may suspect that the relation of either type (24a) or (24c) is present here. In other words, that either RIO operates in these clusters or there is no IO. Hence, theoretically, any sequence such as [bl, tr, gn] etc. may have the following structures:

(27) a.



[bl]

b.



[bl]

In the representation (27a) the governor [b] under (O_1) is indirectly licensed to govern the sonorant [l] under (O_2) by the nucleus (N_2). The nucleus (N_1), locked by the RIO relation (O_1O_2), is licensed by this relation to remain mute. In terms of the element make-up, the governor [b] is composed of (U, ʔ), while the governee is made out of (A, ʔ). This means that both the segments involved in the RIO relation are of equal complexity (2 elements each), which does not favour this

governing relation. In (27b) an alternative view is presented, namely that there is no IO between [b] and [l], and that Proper Government licenses (N_1).

If we opt for (27a), we must bear in mind that in all the stop+sonorant clusters the stops can be lenited to fricatives in weakening contexts. After lenition, the cluster [bl] surfaces as [vl], where the element structures of the cluster members are (U) vs. (A, ʔ), respectively. This means that the potential governor [v] is less complex than the governee by one element. At this juncture, a few obvious questions arise. First, is such a situation theoretically possible? Second, can a governing relation be suspended due to the fact that the governor's element potential is depleted? Third, can a nominal governing segment undergo weakening?

From the theoretical point of view, the first two questions must be answered in the negative. The third one is of a more general nature in that it queries the possibility of weakening under government. In other words, it seems peculiar that a governing segment in an interonset relation may be weakened because (i) its governing abilities worsen, and (ii) its status within the relation should protect it from lenition.

In terms of logic, the answer to the third question must be 'no' as well because if weakening could affect a relation, this relation would need to cease to exist. It seems more likely that no governing relation existed when lenition took place and that this process applied to the left-hand cluster member in the same way as it did to single obstruents. In order to support the view that no government was present between segments in clusters like [bl] at the time of phonological lenition, we will go back to that prehistoric period. We will see which stop +sonorant sequences were the first to undergo weakening.

3.2.4. The chronology of lenition

The process of phonologically motivated lenition in the prehistory of Irish, as shown in Chapter Two, was not a simple and ephemeral phenomenon. Different consonantal segments underwent weakening at different periods of the language development. The following hypothetical chronology of events is based upon McCone (1996). The names of the relevant periods are repeated below:

(28)
PIE → PROTO-CELTIC → INSULAR CELTIC → PRIMITIVE IRISH → OLD IRISH

Briefly, during the Proto-Celtic (PC) period all the Celtic languages were one proto-language. Within the Insular Celtic (IC) epoch the Brittonic (e.g. Welsh) and Goidelic (e.g. Irish) languages spoken in the British Isles seem to have had much in common with each other, while during the Primitive Irish (PI) phase

Irish was already clearly different from Proto-Welsh. Each of these stages is important with respect to lenition, the details of which are presented below. In what follows, C=consonant, V=vowel, while R=resonant.

The first lenition, or Lenition I, occurred in Proto-Celtic and affected the voiced series of stops inherited from Proto-Indo-European. In particular, [b, d, g] were weakened to the corresponding fricatives [v, ð, ɣ] in word-medial position between vowels, i.e. …VCV…, or after a vowel and before resonants such as [r, l, n, w, j], i.e. …VCRV…, e.g.

(29) ***PIE***	***PC***	***IC***	***PI***	***Old Irish***
*te**g**os	*te**ɣ**os	*te**ɣ**ah	*te**ɣ**ə	[tʲeɣ] *teg* – ‘house’
*o**g**nos	*o**ɣ**nos	*o**ɣ**nah	*ɔːnə	[uan] *úan* – ‘lamb’

In Proto-Celtic the IE stop [g] is lenited to the fricative [ɣ] both intervocalically, e.g. *te**g**os → *te**ɣ**os, and between a vowel and the resonant [n], e.g. *o**g**nos → *o**ɣ**nos. The subsequent developments do not concern us here although it is worth noting that the resulting Proto-Celtic cluster [ɣn] in *oɣnos did not survive into Old Irish, similarly to the majority of such sequences. It is also worth noting that, on the basis of indirect (Celtiberian) evidence, McCone (1996:86ff.) assumes that “Proto-Celtic probably did not tolerate postvocalic final stops”. This statement cannot be verified because no word in Proto-Celtic seems to have ended in a stop, but the possibility of lenition of word-final voiced stops should not be excluded at this stage. More doubtfully, the nasal [m] was lenited to the nasal fricative [ṽ] in this period too.

The second weakening, or Lenition II, occurred between Proto-Celtic and Insular Celtic. This process affected the voiced stops, that is [b, d, g] → [v, ð, ɣ], and [m] → [ṽ]. These stops were either single or followed by resonants. The difference between this lenition and that shown in (29) is that now the voiced stops are weakened across the word boundary as well. In other words, the context …VCV… equals …V#CV…, while …VCRV… is now treated on a par with …V#CRV…, e.g.

(30) ***PIE***	***PC***	***IC***	***Old Irish***
*esjo **g**^{w}**r**eːhwo-	*esjo **br**aːwu-	*ehja **vr**aːwu-	[ə ˈvroː] *a bró* – ‘his quern’

In (30) above, the Proto-Celtic voiced stop [b], which originated from the IE [g^{w}], is weakened to the fricative [v] in *esjo **br**aːwu- → *ehja **vr**aːwu- across the word boundary. During this stage of lenition, as illustrated by *e**s**jo → *e**h**ja, also the spirant [s] was weakened to [h] before a resonant (as well as

intervocalically and word-finally). We will return to the lenition of this fricative later in this chapter.

Lenition III took place in Primitive Irish, that is, when the Irish and Welsh branches of Insular Celtic constituted separate primitive languages. During this phase the voiceless stops [t, k][4] underwent weakening to [θ, χ] in all the contexts already mentioned, and also word-finally, e.g.

(31) ***PC***	***IC***	***PI***	***Old Irish***
*esjo **t**eɣos	*ehja **t**eɣah	*eja **θ**eɣa	[ə ˈθʲeɣ] *a theg* – ‘his house’
*esjo sk^{w}e**t**lom	*ehja sk^{w}e**t**lan	*eja ske**θ**la	[ə ˈsʲkʲeːl] *a scél* – ‘his story’
*bere**t**i	*bere**t**	*bere**θ**	[bʲerʲ] *:beir* – ‘(he) bears’ (3sg.conj.)

In Primitive Irish the Insular Celtic stop [t] is lenited to the spirant [θ] word-initially in *ehja **t**eɣah → *eja **θ**eɣa, word-finally in *bere**t**→ *bere**θ**, and medially before the sonorant [l] in *sk^{w}e**t**lan → *ske**θ**la. It is worth noting that in the last two examples the resulting fricative did not survive into Old Irish, i.e. *bere**θ** → *bere**h** → *berə → [bʲerʲ], and *ske**θ**la → *skeːla → [sʲkʲeːl]. In the case of *ske**θ**la → *ske**h**la → *ske**ː**la, the change involved compensatory lengthening. Before Old Irish, [θ] was further lenited to [h] and dropped. In terms of the element make-up, we can see the decomposition of (A-I, H) into (H) and, later, (H) to (_).

To sum up, lenition had three major stages in the prehistory of Irish. During the first phase, medial voiced stops were weakened, before both vowels and resonants. During the second wave, word boundaries ceased to matter to this phonological process, while the third stage led to the spirantization of voiceless stops. The following table shows the chronologically ordered leniting contexts.

(32)

I. …VC$_{(voiced)}$V…	and …VC$_{(voiced)}$RV…	and possibly …VC$_{(voiced)}$#
II. …V#C$_{(voiced)}$V…	and …V#C$_{(voiced)}$RV…	
III.…V(#)C$_{(voiceless)}$V…	and …V(#)C$_{(voiceless)}$RV…	and …VC$_{(voiceless)}$#

We can see above that during the first two stages the initial obstruents in clusters composed of voiced stops followed by sonorants underwent lenition, e.g. [dr] → [ðr], while their voiceless counterparts were still perceived as stop+sonorant clusters, e.g. [tr] even in weakening contexts. This may mean that, during Leni-

[4] Let us recall that at that time there voiceless labial [p], lost in Proto-Celtic, had not yet been reintroduced into the system of Irish.

tion I and Lenition II, [tr] was a still a governing relation, while [dr] was not, which allowed the weakening process to affect only [dr].

While describing Lenition II above, it was mentioned that at that stage the fricative [s] underwent weakening to [h] word-finally, intervocalically (also probably between vowels and resonants) and across the word boundary. On the other hand, no lenition ever affected [s] before voiceless stops, e.g. *esjo **s**k^{w}etlom → *ehja **s**k^{w}etlan → *eja **s**keθla → [ə ˈsʲkʲeːl] *a scél* – 'his story'.

Apart from *s*+voiceless stop clusters, the other noticeable group which never underwent weakening were geminates, both voiced and voiceless, e.g.

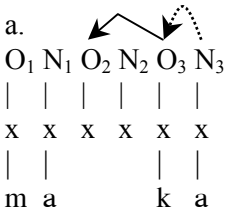
(33) ***PC***	***IC***	***PI***	***Old Irish***
*ma**k^{w}k^{w}**os	*ma**k^{w}k^{w}**ah	*ma**kk**a	[mak] *macc* – 'boy'
*bi**gg**os	*bi**gg**ah	*be**gg**a	[bʲeg] *becc* – 'small'

The fact that these two groups, that is geminates and *s*+voiceless stop sequences, preserved their shape despite omnipresent lenition may suggest that they displayed phonological structures which protected them against weakening. We will consider the possibilities of representing these structures below.

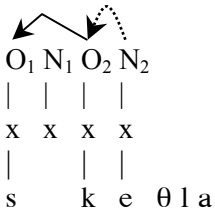
3.2.5. Structures for geminates and s+stop clusters

As mentioned in the introduction to the present GP analysis, sequences of consonants can be represented as ones displaying governing relations such as RIO and LIO, or ones contracting no relation. It is typically assumed in GP that both geminates and *s*+consonant groups belong to the same type (Kaye 1996), which in CV versions of the theory (e.g. Cyran 2003) is referred to as LIO. Consider the following representations of the pre-Old Irish forms containing geminates (34a) and *s*+consonant clusters (34b), based on the assumption that they represent the LIO type. The forms *ma**kk**a – 'boy' and *eja **sk**eθla – 'his story' will serve as examples.

(34) a.



b.



In (34a) the onset (O_3), licensed by (N_3), governs the slot (O_2). By the same token, the onset (O_2), licensed by (N_2), governs (O_1) in (34b). The LIO relation

licenses the intervening nuclei, that is (N_2) in (34a) and (N_1) in (34b), and ensures that neither the first part of the geminate in (34a), nor the fricative [s] in (34b) undergo lenition and that we do not obtain the incorrect *maχka and *ejahkeθla, respectively.[5] To put it briefly, the governing relations shown above 'protect' their members against lenition. Let us recall that earlier we reached a similar conclusion on logical grounds.

Taking into account the fact that *s*+consonant sequences, whose phonological structure is formally similar to that of geminates, are the only word-initial clusters which resist weakening, we may suppose that the structure of all the other consonant groups occurring in this position must considerably differ from those in (34). In particular, all the other consonant clusters word-initially must not be governing relations. This possibility will be entertained in the following section.

3.2.6. Structures for stop+sonorant clusters

3.2.6.1. Decomposition of RIO in voiced stop+sonorant sequences

In the preceding section we concluded that a LIO governing relation protects consonants participating in it from weakening. We also assumed that any governing relation should have the same effect. Now, bearing this assumption in mind, we will turn to voiced stop+sonorant sequences, which underwent lenition at different stages, as sketched in (3.2.4.).

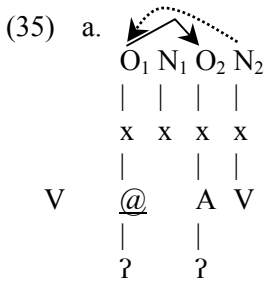
The historical development of lenition shown in (3.2.4.) sheds much light on this issue. In particular, the first segments to undergo lenition in stop+sonorant clusters were the voiced stops, which are weaker than their voiceless congeners by one prime, namely (H), as proposed in (3.2.2.). These voiced segments were by and large equal to the sonorants in terms of elements, e.g. in the cluster [gl] the structures are (@, ʔ) and (A, ʔ), respectively. Taking it for granted that every consonant must be licensed by the following nucleus and every consonant cluster must be government-licensed by a sufficiently strong nucleus, and that the licensing abilities of nuclei are language-specific, the following interpretation of the reason why lenition ever took place in Proto-Celtic may be proposed.

Although the Proto-Indo-European cluster [gl] *may* have entered the period of Proto-Celtic as a RIO relation, we may assume that the decomposition of this structure took place due to the fact that in the new system the governor was not viewed as complex enough. In other words, the PIE nuclei which licensed IO governing relations were capable of granting government-licensing to shallow complexity clusters. When these clusters entered a new phonological system, the

[5] Hayes (1986) argues that true geminates are inalterable because the same melodic material is linked to two positions.

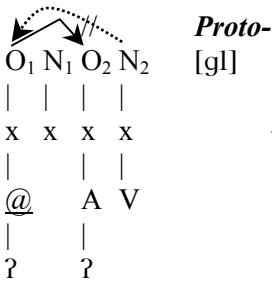
nuclei in that system had different government-licensing abilities. As a result, some of the previous RIO relations were reinterpreted as sequences of independent onsets. This is illustrated below:

(35) a. ***PIE*** [gl]



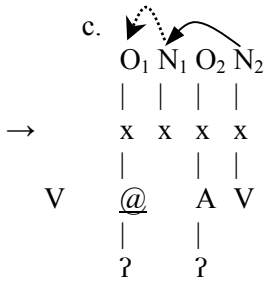
→

b. ***Proto-Celtic*** [gl]

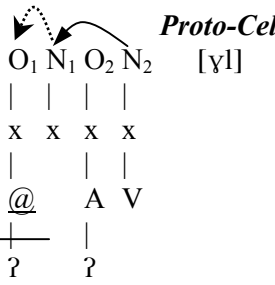


→

c. ***Proto Celtic*** [gl]



→ → d. ***Proto-Celtic*** [ɣl]



In (35a) the governor (O_1), sanctioned by (N_2), governs (O_2) via RIO. Both the governor [g] and the governee [l] have two elements, but in this PIE phonological system such relations seem to be licit. In other words, the nucleus following such a cluster is able to indirectly license a RIO relation contracted between the segments of equal complexity.[6] Additionally, the RIO relation sanctions the nucleus (N_1) to remain mute.

The Proto-Celtic situation, shown in (35b), is different. The licensing properties of nuclei sanctioning RIO relations have changed in the new system.[7] The nucleus (N_2) is now unable to license indirectly the potential governor (O_1) if this segment is not more complex than the potential governee (O_2). As a result, a break-up of RIO takes place and the nucleus (N_1) remains unlicensed. Now, in order to remain silent, it must be sanctioned in a different way. This 'predicament' must not last long and soon Proper Government takes over the licensing of

[6] It is not unlikely that the element (h) defining 'noise' was present in PIE, in which case RIO relations would have been more tenable in that system.

[7] Later in this chapter we will see that the government-licensing power of nuclei in Irish was growing weaker since PIE until Old Irish (and even later).

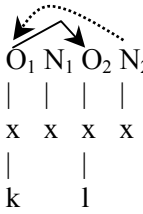
the empty position (N_1), which is shown in (35c). The position (O_1) is licensed by the empty (N_1). Now the left-hand member of the previous cluster is ready for lenition, which takes place in (35d). The weakening consists in the suppression of the stopness element (ʔ).

It is worth recalling that the clusters like [gl] first started to decompose as RIO structures in word-medial position (Lenition I), e.g. *o**gn**os → *o**ɣn**os – 'lamb'. Later on (Lenition II), the same word-initial clusters followed suit and began to be perceived as sequences of independent onsets. In other words, the context …VC(R)V… influenced the context …V#C(R)V… . This development must have occurred due to the reinterpretation of phonological phrases. Close syntactic groups began to constitute phonological phrases, e.g. in *esjo **br**aːwu- → *ehja **vr**aːwu- → [ə vroː] *a bró* – 'his quern' the phrase *esjo braːwu- was initially composed of two phonological words, i.e. *esjo and *braːwu-, which were subsequently reinterpreted as one phrase (or one 'syntagm' as Oftedal (1985) calls it). At the same time, clusters composed of sonorants preceded by voiceless stops were still RIO structures because the nuclei following these sequences were able to license steep complexity relations, e.g. the structure of [kl] equals (@, ʔ, H) vs. (A, ʔ).

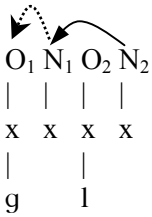
3.2.6.2. Lenition of intervocalic voiced stops

What also needs to be discussed here is the reason why single (i.e. intervocalic) voiced stops were weakened as a result of Lenition I and Lenition II (3.2.4), e.g. (PIE) *te**g**os → (Proto-Celtic) *te**ɣ**os → [tʲeɣ] *teg* – 'house' while the single voiceless stops remained intact at those stages, e.g. *toːteH → *toːtaː → [tuaθ] *túath* – 'tribe'.[8] There may be at least two logical hypotheses connected with this issue. First, that the voiced stops were elementally weak as compared to their voiceless congeners, e.g. [g] = (@, ʔ), while [k] = (@, ʔ, H). Thus, the weaker segment (voiced) is more prone to weakening than the stronger one (voiceless). Second, that the lenition of voiced stops did not begin in single stops, e.g. [g], but in clusters, e.g. [gl]. Strange as it may seem, this assumption is not totally ad hoc because it can be structurally supported. In particular, the Proto-Celtic break-up of RIO relations in sequences like [gl] caused the situation shown in (36b), while the preservation of RIO in clusters like [kl] resulted in the state of affairs represented in (36a) below.

[8] Here, the symbol *H stands for a PIE laryngeal.

(36) a. 

[kl]

b. 

[gl]

In (36a) a RIO relation is contracted between (O_1) and (O_2), unlike in (36b). A major consequence of this difference is the licensing of the empty nucleus (N_1). In particular, in (36a) this empty slot is sandwiched between the RIO members and licensed by this relation, which, in turn, is government-licensed by (N_2). In other words, (N_1) is 'locked' or 'buried' by a governing relation. On the other hand, (N_1) in (36b) is not buried, it is properly governed by the following nuclear slot (N_2), and it is now the licenser for (O_1). As for the contexts in which the two stops occur, the consonant [k] in (36a) finds itself between a vowel and a buried empty nucleus, while [g] in (36b) is positioned between a vowel and an empty nucleus. Moreover, [k] receives licensing from the full vowel under (N_2). Thus, the contexts in which [k] and [g] find themselves are different.

Let us emphasize, then, that at this stage the Irish system began to recognize a difference between the (government)-licensing power of full vowels and empty nuclei.

3.2.6.3. Definition of a leniting context

All this may lead us to the following working hypothesis which may facilitate our understanding of the nature of lenition. Given that (N_1) in (36a) is licensed by RIO just like the nucleus within *s*+consonant clusters and geminate consonants which do not undergo weakening is licensed by LIO, as proposed in (34), we may suppose that the empty slots licensed by IO relations are different from those which are sanctioned by Proper Government. Such an assumption is not revolutionary. Scheer (1998), Szigetvári (2000) and Cyran (2003), among others, also maintain that empty nuclei locked within interonset governing relations play no part in phonology, unlike word-final empty nuclei and word-internal empty nuclear slots licensed by Proper Government. If we follow this line of reasoning, we obtain the following contexts for lenition (listed chronologically):

(37)

a. V_ ø between a vowel and an empty nucleus (where the empty nucleus is not locked by an IO governing relation, i.e. 'unburied')

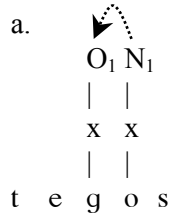
b. V_V between vowels

This (chrono)logical interpretation of the occurrence of leniting contexts is in accordance with McCone's (1996) assumption that the lenition of voiced stops may have occurred in word-final position (i.e. before an empty nucleus) as early as in Proto-Celtic, although this system apparently did not inherit words ending in voiced stops. If the voiced stops were lenitable before an empty nucleus, then the decomposition of RIO structures which placed them in exactly that position caused their weakening to fricatives.

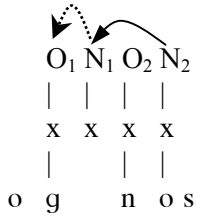
3.2.6.4. Detailed chronology of lenition

Given the two contexts for lenition in (37), one may wonder why the intervocalic context in (37b) should be treated on a par with the one in (37a), that is, between a vowel and an empty nucleus. The licenser for every onset is the following nucleus and the licensing abilities of vowels should naturally be greater than those of empty nuclear slots (Charette 1990; Cyran 2003). Consequently, the lenition of a segment followed by an empty nucleus should occur earlier than the weakening of a consonant preceding a vowel. Consider the following structures which show the licensing of a voiced stop by a vowel (38a), as in *te**g**os – 'house', contrasted with that where the stops is licensed by an empty nucleus (38b), as in *o**g**nos – 'lamb'.

(38) a.



b.



In (38a) the segment [g] under (O_1) is licensed by a full vowel [o] under (N_1), while [g] under (O_1) in (38b) receives licensing from an empty nucleus (N_1), which is properly governed by (N_2). Given these structures, the vowel [o] under (N_1) in (38a) must be more capable of licensing the preceding stop than the empty nucleus (N_1) in (38b). Thus, it is only logical to imagine that the first lenition affected those voiced stops which preceded empty nuclei because the licensing potential of these nuclear positions was the smallest. The weakening of single intervocalic stops must have occurred later, when the licensing potential of vowels following these stops was reduced to the level represented by empty nuclei or, at least, smaller than that of stressed vowels. Given that stress was probably initial in Proto-Celtic, the vowels following single medial stops were unstressed. Later still, the stressed (left-hand) vowels also lost their power to license the

preceding voiced stops. Thus, the stages of lenition offered (3.2.4.) need to be made more detailed. Let us summarize this chronological hypothesis below (V stands for vowels, ˈV for stressed vowels, R represents resonants, while ϕ denotes 'unburied' empty nuclei):

(39)

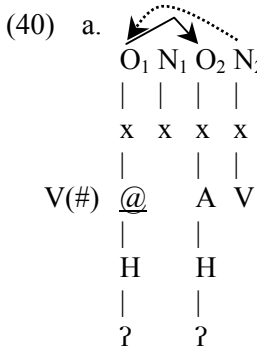
PROCESS	TARGET	CONTEXT	EXAMPLE
Lenition I. a.	***Voiced stops***	V_ϕRV	*o**g**nos → *o**ɣ**nos – 'lamb'
Lenition I. b.	***Voiced stops***	V_V	*te**g**os → *te**ɣ**os – 'house'
Lenition II. a.	***Voiced stops***	V#_ϕRˈV	*esjo **b**raːwu- → *ehja **v**raːwu- – 'his quern'
Lenition II. b.	***Voiced stops***	V#_ˈV	*esjo **b**ena → *ehja **v**ena – 'his woman'

This chronology is more logical from the viewpoint of the licensing abilities of nuclei. Lenition first occurs before empty nuclei, then in front of unstressed vowels, and finally before stressed vowels. Obviously, here the term 'stressed vowel' refers to only those nuclei that occurred in lexical items which immediately followed other vowel-final items in close syntactic groups. Thus, the stressed nucleus in, say, *ˈ**b**raːtiːr → * ˈ**b**raːθir – 'brother', does not qualify as a stressed vowel which lost its licensing potential because both in this word alone and in the phrase *sindos ˈ**b**raːtiːr → *indah ˈ**b**raːθir – 'the brother' the context is not intervocalic, unlike in *esjo ˈ**b**raːtiːr → *ehja ˈ**v**raːθir – 'his brother'.

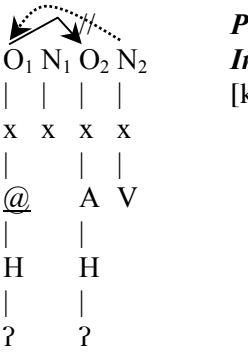
3.2.6.5. Lenition of voiceless stops

Now let us turn to the lenition of fortis stops, both single and in stop+sonorant clusters. It was shown in (3.2.4.) that Lenition III took place in Primitive Irish.

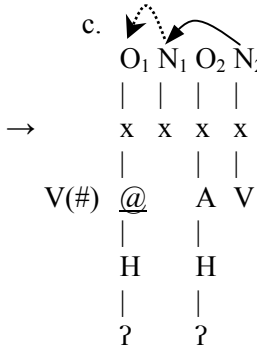
Before this lenition, all the clusters composed of voiced stops followed by resonants had not been RIO relations, which resulted in the weakening of these stops if they occurred between vowels and empty nuclei, both word-medially and initially. On the other hand, all the sequences of voiceless stops preceding sonorants had been well-formed RIO domains. At some point the phonological system started to view the latter sequences as incongruous, as a result of which they began to be treated on a par with the former group. Simultaneously, the single voiceless stops were also viewed as lenition targets. Apparently, these developments had much to do with the continually diminishing power of nuclei whose role was to license both RIO relations and single stops. Therefore, the previously well-formed RIO domains started to decompose. This is shown below:

(40) a. 

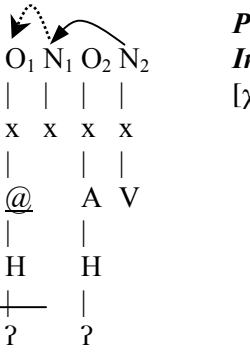
Insular Celtic
[kl]
→

b. 

Primitive Irish
[kl]
→

→ c. 

Primitive Irish
[kl]
→

d. 

Primitive Irish
[χl]

The development in (40) above is a perfect reflection of the changes shown in (35). The nucleus (N_2) in (40a) is able to indirectly license the RIO relation (O_1O_2), which sanctions the nucleus (N_1) to remain inaudible. This is the state of affairs in Insular Celtic. In (40b), which illustrates the situation in Primitive Irish, the nuclear slot (N_2) cannot license RIO any longer, as a result of which the break-up of this relation takes place. This entails the need for Proper Government (40c) to take over the licensing of (N_1). As a consequence, (N_1) changes its status from a buried empty nucleus to an empty nuclear point which is the licenser for its onset [k]. However, it is unable to support all the elements, due to which the lenition of [k] to [χ] occurs, as shown in (40d).

The assumption that we should treat the word-medial unburied nuclei on a par with word-final empty nuclear slots can be confirmed by the way the latter behave with respect to lenition, which is exemplified by Insular Celtic *beret vs. Primitive Irish *bereθ – '(he) bears'. This validates the view that buried empty nuclei are invisible to the phonological structure, while those which are properly governed and those which are word-final perform the same phonological function. In particular, they both can license the preceding onsets and they both act in the same way in leniting contexts.

To sum up this section: the process of lenition, which was launched as early as the Proto-Celtic era, developed gradually all the way down to Primitive Irish. It has been argued above that the initial reason for the Proto-Celtic lenition of voiced stops was the decomposition of shallow complexity RIO structures, e.g. [gl]. Due to this, the voiced stops found themselves followed by empty nuclei whose licensing power was insufficient to support the stopness element in these stops (Lenition Ia). The successive stages of this process were closely connected with the licensing properties of nuclei. First, the unstressed vowels joined empty nuclei in their inability to license lenis stops (Lenition Ib). Then, stressed vowels became unable to license both shallow complexity clusters (Lenition IIa) and single voiced stops (Lenition IIb). A few centuries later even the clusters previously treated as well-formed RIO sequences (fortis stops+sonorants) followed suit and started decomposing. The resulting Primitive Irish weakening (Lenition III) was a consequence of the gradually diminishing licensing potential of nuclei.

3.2.7. The development of s+sonorant clusters

The fricative [s] underwent weakening to [h] in Insular Celtic. This lenition occurred intervocalically (also across word boundaries), word-finally (i.e. between a vowel and an empty nucleus), also most probably, before the sonorants [r, l, n] and, perhaps, in front of [m]. Let us first consider the developments which probably prefaced this lenition.

In Proto-Celtic the intervocalic sequences *-*sm*- and *-*sn*- were assimilated to *-*mm*- and *-*nn*-, respectively. The other two intervocalic clusters, that is *-*sl*- and *-*sr*- were also simplified to *-*ll*- and *-*rr*-, respectively, between Proto-Celtic and Insular Celtic (McCone 1996:45ff.). Word-initial clusters **sn*-, **sl*-, **sr*- and **sm*- remained unchanged until Insular Celtic. During this period two processes took place. In particular, the sonorants [r, l, n] were strengthened (tensed) to [R, L, N] in word-initial position and after the initial [s] in non-leniting contexts, while the clusters **sn*-, **sl*-, **sr*- and, much less obviously **sm*-, were weakened to **hn*-, **hl*-, **hr*- (and possibly **hm*-), respectively, in leniting environments. Let us recall that the leniting contexts were after vowels which terminated the preceding, closely connected words.

The Proto-Celtic simplification of the word-medial *s*+sonorant sequences indicates that no governing relation was present between [s] and the following sonorant, as a result of which the fricative found itself in a typical leniting context specified in (37a), namely between a vowel and an empty nucleus which was not locked by a governing domain. This development is exemplified below:

(41) ***PC/IC*** ***Old Irish***

IE *ko**s**olo- → *ko**sl**o- → (*ko**hl**o-)? → *ko**ll**o- → [koL] *coll* – ‘hazel’

It is impossible to state exactly what the weakening of [s] between the forms such as *koslo- and *kollo- looked like but, given that the typical leniting context V_ ϕ was available, we may suspect that [s] was either deleted straightaway or transformed into [h] for some time before the assimilation into *-*ll*-. In any event, the cluster *-*sl*- gave way to the geminate *-*ll*-.

The subsequent Insular Celtic development was puzzling in the light of what we have just seen. The word-initial **sl*- (and the remaining clusters of this type) were lenited to *-*hl*- when following a vowel of a closely connected preceding word. When not preceded by a such a vowel, **sl*- was allegedly strengthened to **sL*-. It should be noted that this transformation of **sl*- into **sL*- cannot be dated with certainty. Scholars of Old Irish assume that in non-weakening environments [s] preceded tense resonants (Thurneysen 1946; McCone 1996), which is also the case in some dialects of Modern Irish (Ó Siadhail 1989:92ff.). This tenseness may be due to the so-called homorganicity factor, since all the sonorants and [s] are coronals. Consider the reconstructed developments in leniting (42a) and non-leniting (42b) contexts based on the chronology proposed by McCone (1996). The prehistoric versions of [ə ˈhloːɣ] *a slóg* – ‘his army’ and [ə ˈsLoːɣ] *a slóg* – ‘her army’ serve as examples.

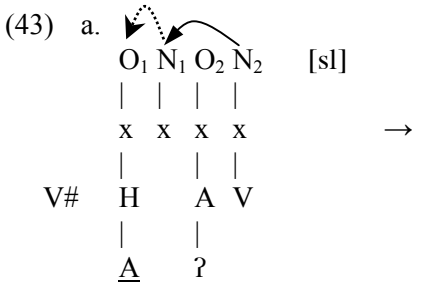
(42) ***Stage I*** ***Stage II*** ***Stage III*** ***Old Irish***

a. *esjo **sl**oːgos	*ehja **hl**oːɣah	*eja **hl**oːɣa	[ə ˈhloːɣ]	– ‘his army’
b. *esjaːs **sl**oːgos	*ehjaːh **sL**oːɣah	*ejaː **sL**oːɣa	[ə ˈsLoːɣ]	– ‘her army’

Stage I shows the state of affairs in Proto-Celtic. The word-initial cluster **sl*- is the same in both the contexts. At Stage II we can observe the lenition of the cluster to **hl*- in the leniting context in (42a). Simultaneously, the same cluster is transformed into **sL*- in a no-mutation (i.e. *h*-prefixing) context in (42b). It should be emphasized again that the change into **sL*- in (42b) is hypothetical. It is not unlikely to assume that this tensing occurred when the pronoun-final segment was still [s], i.e. *esjaːs **sl**oːgos → *esjaːs **sL**oːɣos.

The lenition of **sl*- to **hl*- can be accounted for as a regular development in a typical leniting context. This is illustrated below.

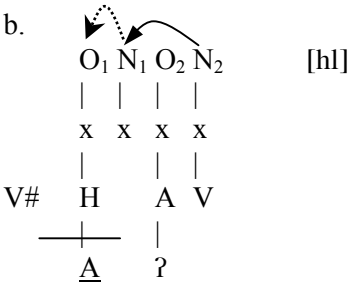
(43) a.



[sl]

→

b.



[hl]

In (43a) there is no IO relation between (O_2) and (O_1). Thus, the fricative [s] under (O_1) finds itself in the leniting context V_ ϕ, i.e. between a vowel and an unburied empty nucleus, as proposed in (37a). The lenition of this segment to [h], viewed as the delinking of (A), is represented in (43b).

If we now turn to the strengthening of the sonorant and the development of **sL*- in non-weakening environments, as exemplified in (42b), it must be admitted that this change escapes straightforward explanation.

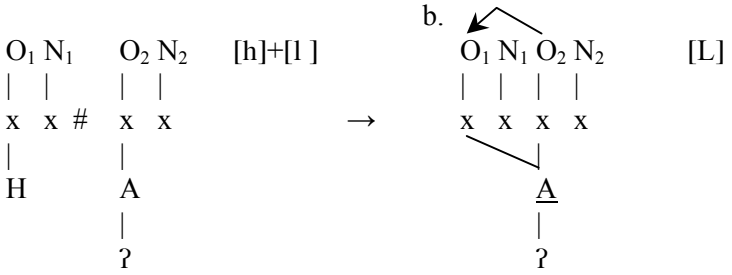
In Chapter Two it was argued that the tensing of word-initial resonants in non-leniting contexts took place in Primitive Irish when the previously lenited [s], that is [h], was dropped. When that happened, the deleting segment left an empty position which was taken over by the following sonorant. One relevant example is repeated below:

(44)

Stage I	***Stage II***	***Stage III***	***Old Irish***
*esjaːs laːmaː	*ehjaːh laːṽaː	*ejaː Laːṽaː	[ə ˈLaːṽ] *a (l)lám* – ‘her hand’

The most important in this sequence of events is the transition between Stage II and Stage III. At this point the pronoun-final [h] is dropped and the noun-initial sonorant is tensed or geminated at the expense of the deleting spirant. This interpretation is totally hypothetical because there is no evidence that the word-initial [l] was tensed between Stages II and III and not between Stages I and II. The only argument supporting this analysis is that in Old Irish the initial liquid was optionally doubled in writing, which may have denoted gemination. Now, the only conceivable period for gemination seems to be when the final segment of the closely connected preceding word is dropped. This development is repeated below for convenience.

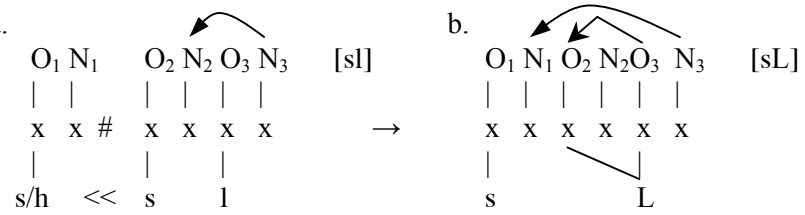
(45) a.



In (45a) the pronoun-final [h] is linked to (O_1), while the lax [l] is associated with (O_2). In (45b) the fricative delinks and vacates the onset (O_1). The sonorant takes over this position, i.e. LIO is contracted, which results in gemination and tensing. Thus, this analysis works for the tensing of word-initial sonorants, but it does not seem very helpful if we wish to explain the tensing of sonorants after [s]. We cannot exclude that this tensing was not a truly phonological process.

In Chapter Two we particularly emphasized that the tensing of resonants is, in our analysis, very closely connected with gemination. Given the change of *esjaːs **sl**oːgos → *ehjaːh **sL**oːɣah – 'her army' in (42b), or perhaps even an earlier change of *esjaːs **sl**oːgos → *esjaːs **sL**oːɣos, it is not impossible to assume that the resonant [l] was geminated to [L] indeed, and that the fricative [s], which was present before [L], was 'pushed' leftwards and joined the preceding pronoun, which also historically ended in [s]. This hypothesis is graphically represented below.

(46) a.



In (46a) lax liquid [l] is linked to the onset (O_3), the preceding [s] to (O_2), while the pronoun-final [s] or [h] (it is impossible to ascertain if lenition has already taken place) is associated with (O_1). The nucleus (N_3) properly governs (N_2). As a result of removing morphological boundaries, the liquid geminates at the expense of (O_2). The spirant [s], finding a mirror image segment in the preceding onset (O_1), joins it, thus making room for the liquid to geminate. The nucleus (N_2) is now buried by LIO, while (N_1) must be properly governed by (N_3).

To conclude, the lenition of [s] in *s*+resonant clusters indicates that no government was present between these segments. Note that [s] was weakened in a

regular lenition site specified in (37a), that is, between a vowel and an empty unburied nucleus. As regards the tensing of lax sonorants which followed [s] in non-leniting contexts, the option presented above leaves much to be desired. Unfortunately, no more plausible answer can be offered at this stage of research.

3.2.8. f+liquid clusters in prehistory

The Old Irish word-initial *f*+liquid clusters, that is [fl] and [fr], have a very short history. Before Primitive Irish, these sequences were composed of the glide [w] followed by liquids, e.g. *writgarijan → *wreggareja → *wregare → [fʲrʲegre] *frecrae* – 'answer'. Roughly in the middle of Primitive Irish, all the word-initial **w*'s (including those which were context-free) started to be replaced by [f] under the influence of non-leniting contexts. For example, as described in detail in Chapter Two, the context-dependent change of [w] to [f] in the nominative singular preceded by a definite article, i.e. *iNda**h** **w**erah → *iNda **f**era → [iNʲ ˈfʲer] *in fer* – 'the man' (where the fusion of [w] and [h] resulted in the appearance of [f]) influenced the context-independent nominative singular, i.e. *werah → *wera → *wer (but in Classical Old Irish [fʲer]). Briefly, the change of [w] → [f] was only sometimes phonologically motivated and yet the replacement on a large scale occurred soon afterwards. Before this happened, the lenition of [w] to ɸ was established, e.g. *iNdi: wiri: → *iNdi wiri → [iNʲ ˈdʲirʲ] *ind fir* – 'of the man'-gen.sg.

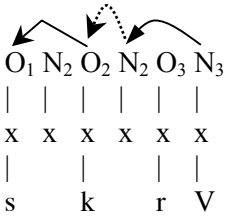
The situation in *w*+liquid sequences was exactly the same as in the cases just presented. The labial glide was lenited to ɸ in weakening contexts. The liquid remained as the actual phonetic word beginning, which can be exemplified by the Old Irish [fraɣʲ] *fraig* vs. [mə ˈraɣʲ] *mo fraig* – 'wall'/'my wall'. The fact that the word-initial glide was lenited, similarly to word-initial stops in stop+sonorant sequences, e.g. [kr] → [χr], indicates that no governing relation was present between [w] and the following liquid. Since such a relation was absent, the weakening of the glide took place and the phonetic zero resulted if [w] found itself in a lenition context V_ɸ, that is between a vowel and an empty nucleus. In non-leniting contexts, the sequence *w*+liquid remained until it was systemically replaced by the *f*+liquid cluster.

In this section we have seen that, although the clusters composed of *f*+liquid had different origins than stop+sonorant sequences, the phonological behaviour of these two groups was alike. In particular, the lack of a governing relation between the initial obstruent and the following resonant led to the possibility of lenition of the obstruent in weakening contexts.

3.2.9. s+cluster combinations

A word should also be said about the word-initial *s*+stop+liquid clusters, which are found in, e.g. [sʲkʲrʲiːn] *scrín* – 'shrine'. Items like these, except perhaps [skr], are almost exclusively loanwords borrowed when all the mutations had been lexicalized, i.e. no longer phonologically motivated. Nevertheless, given that *s*+stop sequences are viewed here as classic examples of LIO, while there is no relation between the stop and the following sonorant in binary combinations, we may propose that the structure of every *s*+cluster combination is represented as follows ([skr] serves as an example):

(47)



In this representation LIO is contracted between the governor (O_2) and the governee (O_1), where the whole relation is licensed by the unburied empty nucleus (N_2) which, in turn, is properly governed by (N_3). No relationship holds between (O_2) and (O_3), similarly to what can be seen in binary stop+sonorant sequences.

The assumption that a LIO relation contracted between [s] and a following voiceless stop is licensed by an empty nuclear position can be confirmed by the fact that clusters such as [sk] or [st], occur word-finally as well, e.g. [tʲesʲtʲ] *teist* – 'testimony' and [Resk] *resc* – 'talk', where the domain-final empty nucleus can be treated as their LIO-licenser.

Therefore, the word-initial ternary combinations composed of *s*+stop+liquid are realizations of phonological structures occurring in binary clusters. In other words, every *s*+stop+liquid sequence is viewed as a cluster composed of *s*+stop, i.e. a LIO relation, the liquid being irrelevant to the structure.

3.2.10. Word-initial clusters – summary

Above it has been demonstrated that the behaviour of word-initial clusters with respect to lenition can be indicative of their phonological structure. Lenition has been viewed as a prehistoric phonological process affecting a single consonant between two melodically filled nuclei, i.e. V_V, or between a vowel and an unburied empty nucleus, i.e. V_∅. Theoretically, once two consecutive consonants (C_1) and (C_2) contract an interonset relation (IO) in either direction, neither (C_1) nor (C_2) find themselves in a leniting context. It is in this respect that we may

say that government 'protects' from lenition. What IO does, however, is merely an elimination of the phonological context for lenition. IO can be contracted only if the substantive complexity condition is met and if the following nucleus is able to prosodically license the preceding governing relation.

On the basis of the above assumptions we can propose a correlation between the element complexity of cluster members and the fact that lenis stop+sonorant sequences were the first to undergo weakening. In particular, it has been argued that shallow complexity rightward interonset relations (RIO), e.g. [gn], were broken-up in Proto-Celtic due to the diminishing government-licensing power of the following unstressed nuclei. As a result, the lenis stops found themselves in the lenition context V_∅. Under the influence of lenition in this context, these stops were weakened also in the other context, that is V_V. The gradually diminishing licensing capability of nuclei has been held responsible for the break-up of previously well-formed RIO structures, e.g. [tr], in Primitive Irish, which led to the lenition of the voiceless stops in these clusters. By analogy, single voiceless obstruents were lenited as well. The inevitable logical conclusion is that no RIO relation seems to be present in Old Irish.

s+obstruent clusters, e.g. [sk], were the only ones which resisted lenition. In the light of our assumptions, it should be proposed that these clusters are representatives of the leftward interonset relation (LIO). Being involved in LIO, neither of the cluster members finds itself in a lenition context and remains radical.

3.2.11. Rising-sonority word-medial clusters

Word-medial rising sonority clusters, that is, consonant sequences similar to those occurring word-initially, are few and far between in Old Irish. Let us recall that these clusters fall into two types: (a) stops+lax sonorants and (b) fricatives+ lax liquids. Representative cases are repeated below for convenience:

(48)	a. STOP+SONORANT			b. FRICATIVE+LIQUID		
[egne]	*ecnae*	– 'wisdom'		[kʲelʲəvrəðʲ]	*celebraid*	– 'bid farewell'
[oblu]	*oblu*	– 'host'		[dʲiːθrəv]	*díthrub*	– 'wilderness'

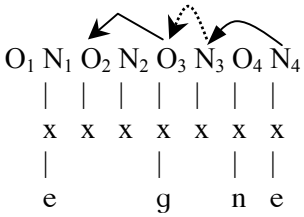
The clusters shown in (48b) resemble those which were formed after the lenition of original word-initial stop+sonorant sequences, e.g. *esjo braːwu- → *esjo vraːwu- → [ə vroː] *a bró* – 'his quern'. In prehistoric times, the Old Irish cluster [vr] in *celebraid* was also a stop+sonorant sequence, that is [br]. The fact that in Old Irish the liquid [r] is preceded by the fricative [v] indicates that the decomposition of RIO, if such a relation had ever existed in stop+sonorant sequences, took place in a regular fashion in the prehistory of Irish (most probably in Proto-

Celtic). In other words, the word-medial RIO relation was not present, as a result of which the original stop found itself in a classic lenition site: between a vowel and an empty nucleus, i.e. V_ɸ, and was lenited to the corresponding fricative, as shown in (3.2.6.).

More interestingly, the clusters in (48a) show no similarity to word-initial sequences undergoing lenition. It is impossible to find a stop+sonorant sequence like [gn] word-initially in a historical leniting context. Such a combination must be realized as a fricative+sonorant cluster [ɣn]. Quite unexpectedly, the word *ecnae* – 'wisdom' was pronounced with a stop, i.e. [egne], and not with a fricative, i.e. *[eɣne]. Thus, we are dealing either with an exception or with a form whose Old Irish shape is not indicative of its underlying phonological structure. In other words, the stop [g] may not be associated with one skeletal slot.

Thurneysen (1946:86ff.) argues that wherever prehistoric lenition of consonants did not take place in a regular way, gemination of these segments may have been one of the obstacles. In the case of *ecnae* – 'wisdom', Thurneysen proposes that its prehistoric version was *eg-gne, which means that the stop [g] was not single at the time of lenition. If this was the case, the governing relations in prehistoric times can be represented as follows:

(49)



The LIO relation between the governor (O_3) and the governee (O_2), both constituting a geminate, locks the nucleus (N_2) and ensures that the voiced stop is immune to lenition, i.e. that we do not obtain *[eɣne]. Let us recall that [g] would have undergone lenition only as a simplex onset. This LIO relation (O_3O_2) is licensed by (N_3) which is properly governed by (N_4). Moreover, no relation can be contracted between (O_3) and (O_4) because no RIO is present in the system.

Thus, the presence of word-medial clusters composed of stops followed by sonorants and fricatives preceding sonorants in Old Irish confirms the idea that every stop involved in a governing relation preserved its PIE shape, while it was lenited to a fricative when such a relation was missing.

3.2.12. Subsequent epenthesis in rising-sonority word-medial clusters

An interesting issue connected with rising-sonority word-medial clusters is their later behaviour. Their development after the period of Old Irish shows that they lost the status of clusters in some dialects (mainly in Munster). In other words, epenthetic vowels split consonant sequences in this position. This phenomenon, which is called secondary epenthesis,[9] is exemplified below:

(50)	***Old Irish***		***Modern Irish***
a.	[egne] *ecnae*	– 'wisdom'	[agənə] *eagna*
b.	[aχrəN] *achrann*	– 'thicket'	[aχərən] *achrann*

We remember from (3.2.11.) that in [egne] the velar stop survived lenition intact because it was a geminate during the weakening period, while the original [k] in the prehistoric version of [aχrəN] was lenited to [χ] due to a lack of IO between this stop and the following liquid. These two diverse prehistoric developments led to the difference between stop+liquid (50a) and fricative+liquid (50b) sequences in Old Irish. In some Modern Irish dialects, however, these two originally different structures behave in the same fashion with respect to epenthesis. Despite this word-internal epenthesis, word-initial clusters, both radical (stop+sonorant) and lenited (fricative+sonorant) by and large remain intact in Modern Irish, although there are a few exceptions, e.g. [dəˈnuːs] *drúis* – 'lust' (Ó Siadhail 1989:23).[10] More interestingly, it does not seem to matter whether the clusters split by epenthetic vowels precede stressed or unstressed vowels, e.g. [madərə] *madra* – 'dog' (initial stress, i.e. before the split cluster [dr]) vs. [sʲəməˈroːg] *seamróg* – 'shamrock' (final stress, i.e. following the split cluster [mr]).

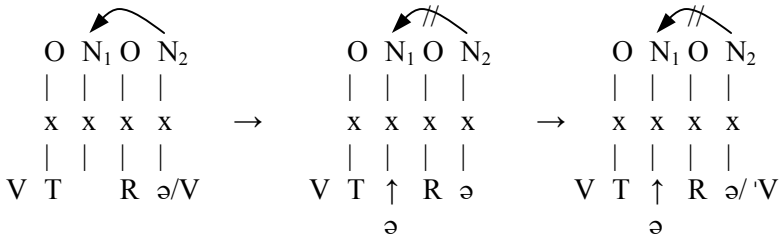
Without hypothesizing about the structure of these words in some dialects of Modern Irish, we can make the following observation concerning the nature of the historical development of obstruent+sonorant sequences. In Old Irish in both (50a) and (50b) the empty nucleus separating the obstruent from the following sonorant was properly governed by the next vowel. Afterwards, this unstressed nucleus apparently lost its power as a proper governor. Later still, stress ceased to be fixed to the initial syllable only and yet the majority of word-initial clusters resisted epenthesis. This may indicate that all the medial obstruent+sonorant clusters followed by unstressed vowels (i.e. schwas) were split by epenthetic vo-

[9] The phenomenon of regular epenthesis in some dialects of Modern Irish is discussed below.

[10] Apparently, such exceptions are typical of only some dialects. The example above comes from Ring, a variety of Munster Irish (Ó Siadhail 1989).

wels (i.e. schwas) and, when this phenomenon was generally established, also the non-initial clusters which preceded stressed vowels followed suit. This hypothesized development is proposed below (where V is a vowel, T stands for any obstruent and R for any sonorant):

(51) a. ***Old Irish*** b. ***transition*** c. ***Modern Irish***



In (51a) we can observe the non-initial stop/fricative+resonant cluster in Old Irish, where the empty nucleus (N_1) separating the cluster members is properly governed by the vowel under (N_2), e.g. [egnɛ] *ecnae* – 'wisdom'. At this point the stress is fixed to the initial syllable and the nucleus (N_2) is unstressed (V). After this stage the unstressed vowel (N_2) can no longer properly govern a preceding empty nucleus. This results from the gradually diminishing licensing power of nuclei in the Irish system since the Proto-Celtic period. As a consequence, an epenthetic vowel surfaces under (N_1) at the transition stage in (51b).[11] In Modern Irish in (51c), the status of the vowel following such a cluster is irrelevant: it can be stressed (ˈV), e.g. [sʲaməˈroːg] *seamróg* – 'shamrock', or unstressed (V), e.g. [agənə] *eagna* – 'wisdom', because epenthesis has already been established between non-initial obstruent+sonorant sequences. As to Modern Irish epenthesis in word-initial clusters, e.g. [dəˈnuːs] *drúis* – 'lust', this exceptional phenomenon must be connected with the fact that clusters in some dialects (like in Ring above) are insensitive to which kind of vowel (i.e. stressed or unstressed) follows them because neither is a proper governor. In most dialects the stressed vowel can be a proper governor, while the phonetic schwa cannot.

To conclude, it has been hypothesized that Proper Government can be viewed as a phenomenon dependent on the prosodic strength of nuclei. In GP vowels can be proper governors while empty nuclei are not able to perform this task. The development of secondary epenthesis between the periods of Old Irish and Modern Irish indicates that schwas can be proper governors in some systems but not in others. This issue requires further investigation, however.

[11] The period between Old and Modern Irish is called 'transition' here because the exact dating of this phase cannot be offered at this stage.

3.2.13. The development of word-medial falling-sonority clusters

So far we have been following the assumption that governing relations must be contracted if they can. Thus, if certain segments are capable of governing others, they must do so, unless we discover the reasons why government can be questionned. In the case of word-initial and medial stop+sonorant clusters, which were deemed to be RIO relations at first, the main argument to disfavour RIO is the lenition of the potential governors. Now we will inspect the falling-sonority medial clusters which presumably display LIO governing relations.

To begin with, the Old Irish word-medial clusters fall into three types with respect to their subsequent development. This division can be schematized and exemplified as follows:

(52) CLUSTER TYPE	OLD IRISH		MODERN IRISH
a.			
(i) ***Sonorant***			***– no change***
+voiceless stop	[goRte] *gortae*	– 'famine'	[gortə] *gorta*
(ii) ***Voiceless spirant***			***– no change***
+voiceless stop	[m^{i}eske] *mescae*	– 'intoxication'	[m^{i}es^{i}k^{i}ə] *meisce*
	[s^{i}N^{i}eχte] *snechtae*	– 'snow'	[s^{i}N^{i}aχtə] *sneachta*
b.			
(i) ***Sonorant***			***– vowel epenthesis***
+voiced obstruent	[argəd] *argat*	– 'money'	[ar^{i}ig^{i}əd] *airgead*
	[banv] *banb*	– 'piglet'	[banəv] *banbh*
(ii) ***Sonorant***			***– vowel epenthesis***
+sonorant	[m^{i}enme] *menmae*	– 'mind'	[m^{i}anəmə] *meanma*
c. ***Tense sonorant***			***– simplification***
+homorganic voiced stop			
	[im(b)^{i}e] *im(b)e*	– 'of butter'	[im^{i}i] *ime*
	[k^{i}eN(d)a] *cen(d)a*	– 'heads'	[k^{i}aNə] *ceanna*

The clusters included in (52a), which are composed of sonorants or fricatives followed by voiceless stops, e.g. [Rt] and [χt], have undergone no change up to the present. Their stability and unchangeability for over the past twelve centuries indicate that they can be viewed as LIO relations. If we look at the element complexity of Old Irish clusters from (52a), all these sequences are well-formed, e.g. [Rt] equals (A) vs. (A-I, ʔ, H), while the structure of [sk] is (A, H) vs. (@, ʔ, H).

What is more, it was proposed in (3.2.5.) that *s*+voiceless stop sequences occurring word-initially can be regarded as LIO structures. There is no reason, then, to treat identical sequences in word-medial position differently.

The collection in (52b) is much more complicated. Beside well-behaved sequences such as [rg], whose element representation is (A) vs. (@, ʔ), we also find clusters such as [nv], in which the structure (A-I, N) vs. (U) shows no element advantage of the potential governor over the governee and suggests that LIO is doubtful. Moreover, the development of an epenthetic vowel separating the cluster members is likely to have taken place in Old Irish (Greene 1952). This may also support the view that LIO should not be present in these clusters.

The clusters in (52c) seem to be uninteresting in that only their simplification from sonorant+voiced stop sequences to sonorants alone took place. The exact dating of this simplification cannot be offered, although it is likely, given that as early as in Old Irish the spelling fluctuated, e.g. *cenda* or *cenna* – 'heads', that the deletion of stops occurred during this period. From the viewpoint of governing relations, it is difficult to assume that a cluster like [mb] was a LIO relation if its simplification to [m] was about to take place. We will return to these clusters when analyzing final falling-sonority sequences in the following section.

To sum up, so far only the clusters shown in (52a), i.e. sonorants+voiceless stops and voiceless fricatives+voiceless stops, can be viewed as LIO relations. The two types from (52b), that is sonorants+voiced obstruents and sonorants +sonorants, do not always display sufficient element complexity slope between the potential governors and governees. The same is true about (52c).

3.2.14. The development of word-final falling-sonority clusters

Similarly to the word-medial clusters shown in (52), the final falling-sonority combinations developed in three ways, although their post-Old Irish history is not identical to that of word-medial sequences. Consider the examples below:

(53) CLUSTER TYPE	OLD IRISH			MODERN IRISH
a.				
(i) ***Sonorant***				***– no change***
+voiceless obstruent	[olk]	*olc*	– 'bad'	
	[korp]	*corp*	– 'body'	
	[goRt]	*gort*	– 'field'	
(ii) ***Voiceless spirant***				***– no change***
+voiceless stop	[Loχt]	*locht*	– 'fault'	
	[tost]	*tost*	– 'silence'	

CLUSTER TYPE	OLD IRISH		MODERN IRISH
b.			
(i) ***Sonorant***			***– vowel epenthesis***
+voiced obstruent	[borb]	*borb* – 'rough'	[borəb]
	[bolg]	*bolg* – 'belly'	[boləg]
	[banv]	*banb* – 'piglet'	[banəv]
(ii) ***Sonorant***			***– vowel epenthesis***
+sonorant	[doRN]	*dornn* – 'fist'	[dorən]
	[an^{i}m^{i}]	*ainm* – 'name'	[an^{i}im^{i}]
(iii) ð***+voiced obstruent***			***– simplification and vocalization*** [12]
	[taðg] *Tadg*	– a name	[taig] *Tadhg*
c. ***Tense sonorant***			***– vowel lengthening***
+homorganic voiced stop			***or diphthongization***
	[im(b)] *im(b)*	– 'butter'	[iːm] *im*
	[k^{i}eN(d)] *cen(d)*	– 'head'	[k^{i}auN] *ceann*

Generally, the examples in (53) correspond to those in (52). This is hardly surprising since there is no major structural difference between a cluster followed by a vowel and a sequence preceding an empty nucleus. In both cases we are dealing with a sequence of two onsets (presumably connected via IO) followed by a government-licensing nucleus. The cases in (53a) are perfectly comparable to those in (52a) in that no change has ever affected them. They are also invariably well-behaved in terms of element complexity, e.g. [lk] can be represented by (A, ʔ) vs. (@, ʔ, H), while [χt] is (@, H) vs. (A-I, ʔ, H). Given this structural argument and taking into account our earlier ((3.2.5.) and (3.2.9.)) proposal concerning *s*+voiceless stop clusters, both [st] and [stør], where it was shown that these can be viewed as LIO relations which can be licensed by 'unburied' empty nuclei, we may conclude that all the clusters in (53a) belong to the LIO type.

The cases in (53b) parallel those in (52b) in that an epenthetic vowel separated the cluster members very early in the history, perhaps already in Old Irish, as proposed by Greene (1952). The element complexity slopes within these clusters are also frequently unsatisfactorily shallow. On the one hand, we can see well-

[12] These sequences are included here since, before simplification, epenthesis took place relatively early, e.g. [taðg] → [taðəg] → [tajəg] → [taig] (see Greene (1952) and Ó Siadhail (1989) for details).

formed combinations such as [rb], with the element structures of (A) vs. (U, ʔ), while on the other we encounter clusters like [nv] where the structure is (A-I, N) vs. (U), which must disfavour a LIO relationship straightaway.[13] It is not ad hoc, then, to assume that vowel epenthesis split these clusters in Old Irish. Later in this chapter, we will take a closer look at this issue.

The examples in (53c) are also problematic. Given that we are dealing here with homorganic sonorant+voiced stop sequences, it is not obvious whether we should treat the element structures as separate, e.g. [mb] = (U, ʔ, N) + (U, ʔ), or as partial geminates (Harris 1994:166), where the prime responsible for the place of articulation is provided by the governor, in which case the element structure of [mb] should be (N, ʔ) + (U, ʔ). We could go even further, as we did in Chapter Two, and propose that the only prime distinctively lodged under the position occupied by the governee is the nasality component, which would result in the structure (N) in the governee vs. (U, ʔ) in the governor.

The cases in (53c) show another interesting property, however. If we compare the subsequent development of the Old Irish word-medial clusters from (52c), e.g. [mb] → [m], with a change of word-final sequences from (53c), e.g. [mb] → [m], we can conclude that these two seemingly identical changes are in fact different. Consider representative examples juxtaposed below:

(54)	OLD IRISH				MODERN IRISH	
a.	[imb]	or [im]	*im(b)*	– ‘butter’	[iːm]	*im*
	[kʲeNd]	or [kʲeN]	*cen(d)*	– ‘head’	[kʲauN]	*ceann*
b.	[imbʲe]	or [imʲe]	*im(b)e*	– ‘butter’-gen.sg.	[imʲi]	*ime*
	[kʲeNda]	or [kʲeNa]	*cen(d)a*	– ‘heads’	[kʲaNə]	*ceanna*

In (54a) the Old Irish cluster, or the tense sonorant alone, is word-final. In Modern Irish this fact results in vowel lengthening, frequently combined with diphthongization. On the other hand, the same cluster or the tense nasal is followed by a vowel in (54b). In Modern Irish no vowel lengthening takes place in this context.

Interestingly, the Modern Irish vowel lengthening occurs also before the Old Irish tense liquids which were not followed by stops. Consider the examples below (Cyran 1997:110; Bloch-Rozmej 1998:112):

[13] Gussmann (1999) proposes that, apart from element complexity, segments are also characterized by ‘strength’. Thus, theoretically, an inherently ‘strong’ segment could govern a ‘weak’ one even if the former is not sufficiently complex.

(55) a. CONNEMARA IRISH

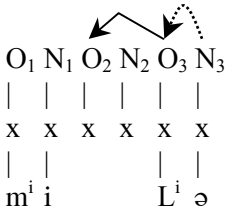
[m^{i}iːL] *mill* vs. [m^{i}iL^{i}ə] *mille* – 'destroy'/'destruction' (Old Irish [m^{i}iL] *mill*)

b. MUNSTER IRISH

[bɑːr] *barr* vs. [bɑrə] *barra* – 'top'/pl. (Old Irish [baR] *barr*)

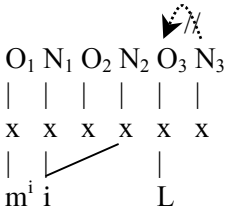
The cases above clearly exemplify short-long vowel alternations before resonants which used to be tense in the past and have mostly retained this property. Both the authors mentioned above account for these vocalic alternations in terms of underlying gemination. Following their line of reasoning, we can represent the Modern Irish quantity alternations as follows:

(55) a.



[m^{i}iL^{i}ə]

b.



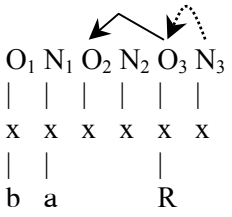
[m^{i}iːL]

In (55a) we can see an interonset relation held between the onsets (O_3) and (O_2). This IO can be established because (O_3) is licensed to perform this operation by the following realized nucleus (N_3). Consequently, the sonorant occupies two skeletal positions although this fact does not always find phonetic manifestation in all the Irish dialects. In (55b) we can observe a long vowel in front of a tense sonorant when the final nucleus (N_3) is empty. This nucleus is thus too weak (//) to license the preceding onset (O_3) to establish an IO relation with (O_2). As a result, (N_1) spreads its melody to the following nucleus (N_2).

3.2.15. The structure of tense sonorants

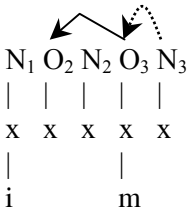
Given that in Modern Irish all the previously tense sonorants can be said to have geminate structure, which can be decomposed only before a weak licenser, we may theoretically assume that in Old Irish the situation was similar. In particular, that all tense sonorants found in medial and final position were geminates. Consider the following representations:

(56) a.



[baR] *barr*

b.



[im(b)] *im(b)*

The representation in (56a) is uncontroversial. A LIO relation licensed by the empty nucleus (N_3) obtains between (O_3) and (O_2) and the tense liquid [R] has a geminate structure. The situation in (56b) is much more complicated. If we assume that the nasal [m] is also a geminate, there is no straightforward way of explaining why the stop [b] may in any way remain in the phonological structure or, to be more precise, in the optional mediaeval spelling.

One argument in defence of (56b) can be formulated in the following way. McCone (1996:141) treats the orthographic word-final sequences such as [mb] or [Nd] as hypercorrect. This amounts to saying that there were probably no sonorant+homorganic voiced stop clusters in this position and the spelling may have reflected the state of affairs from before apocope which deleted all short final vowels (mostly schwas) in late Primitive Irish, i.e. *æmbə → *ɪmbə → (apocope) → [im] *im(b)* – 'butter' and *LaNda → *LaNdə → [LaN(d)] *lan(d)* – 'open space'.[14] Thus, these clusters were probably simplified just after apocope. What is peculiar about the Old Irish spelling is that words which originally contained double sonorants and had no clusters composed of sonorants followed by voiced stops before Old Irish, displayed such combinations in optional variants in Old Irish, e.g. *k^{w}ennom → *k^{w}ennan → *kennə → [k^{i}eN] or [k^{i}eNd] *cen(d)* – 'head'. Thus, there seem to be two sources of the tense sonorants in Old Irish. One is the development of the original geminates, e.g. *nn → [N] in *kennə → [k^{i}eN], the other is the tensing of the original single sonorants before the homorganic obstruents, e.g. *nd → *Nd → [N(d)] in *landa → *LaNdə → [LaN(d)].

Bearing in mind the assumption that in Old Irish there were no word-final sonorant+homorganic lenis stop clusters, e.g. the sequences of [mb], [Nd], [ŋg], [Ld], were in fact [m], [N], [ŋ], [L], respectively, let us study the prehistoric developments of these segments in detail.

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[14] In Modern English we are dealing with a similar situation. In most varieties of English, words like *lamb* and *song* are pronounced as [læm] and [soŋ], respectively, while in Scots, a variety spoken in Scotland, words such as *land* are pronounced as [læn] (Harris 1994:85). See also Gussmann (1998) for an analysis of the English sound [ŋ].

3.2.16. The prehistoric development of sonorant+obstruent sequences

Let us now focus on regular prehistoric developments in which the original lax sonorants were tensed in front of homorganic stops, both voiced and voiceless. Consider the following reconstructed developments, based on McCone (1996), which illustrate this tensing:

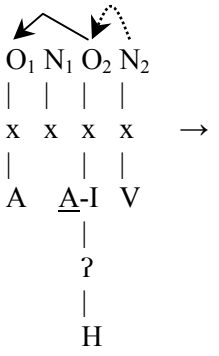
(57) ***PC***	***Tensing Stage***	***Old Irish***
*la**n**da	→ *La**N**da	→ *La**N**də → [LaN(d)] *lan(d)*– ‘open space’
*ne**r**tom	→ *Ne**R**tan	→ *Ne**R**tə → [N^{i}eRt] *nert* – ‘strength’

It is clear from (57) that the Proto-Celtic lax sonorants, i.e. [n] in *la**n**da and [r] in *ne**r**tom, were subsequently tensed to [N] and [R], respectively, in front of the homorganic stops. No similar tensing ever occurred before the heterorganic obstruents, e.g. *se**l**gaː → *se**l**ga → [s^{i}elg] *selg* – ‘hunting’, where the original [l] remains lax.

Before we proceed to the further developments of these forms, let us note that in (57) also the initial sonorants [l] and [n], which used to be lax in Proto-Celtic, were tensed afterwards, probably between Insular Celtic and Primitive Irish. In Chapter Two it was proposed that this change did not take place in a linguistic vacuum but had much to do with reductions which occurred in the immediately preceding and closely connected (function) words, e.g. *ejaːh **n**ertan → *ejaː **N**eRta → [ə ˈN^{i}eRt] *a nert* – ‘her strength’. After the deletion of the pronoun-final spirant [h], the nasal occupied its position, i.e. it became doubly linked (geminated) and tense. This gemination in the contextual variant had impact on the radical form, even in isolation. Thus, instead of ***n**eRta, the word-initial tense resonant was used afterwards and the radical form was reinterpreted as ***N**eRta. Whether or not the initial sonorant in ***N**eRta was still a geminate in Old Irish is uncertain, but it was undoubtedly tense. This may mean that at some prehistoric stage gemination equalled tenseness. Afterwards, the geminate structure may have been simplified, but the property of tenseness remained.

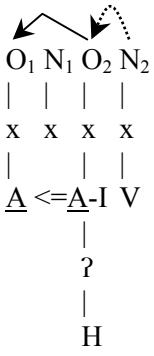
Returning to the tensing of resonants before the homorganic stops, we must state unequivocally that gemination understood as linking the same melody to two positions was unlikely in this context. Instead, we may propose that the homorganicity factor was decisive and that the originally lax sonorants became tense under government. This is represented below, with (58b) and (58c) illustrating two theoretical options of the final outcome:

(58) a.



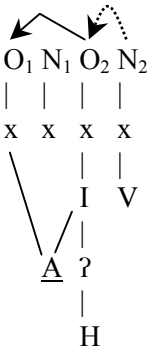
[rt] →

b.



or

c.

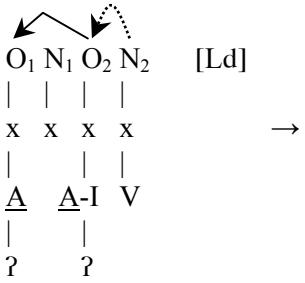


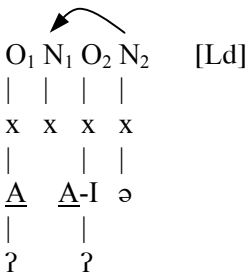
[Rt]

In (58a) we can see the situation before the tensing of the liquid [r]. A LIO governing relation between (O_2) and (O_1) is licensed by the following vowel (V) under (N_2). As a result of LIO, in (58b) the headedness from the element (A) under (O_2) is spread to the same element under (O_1). A slightly different representation is shown in (58c), where the element (A) is simply doubly linked. Due to this, the liquid is tensed. Whichever solution is better, the homorganicity factor under a governing relation was crucial in the tensing of sonorants and the headedness of (A) in the sonorant seems justified in either way.

After this tensing, two developments occurred. First, the word-final short full vowels were reduced to schwas. Second, these schwas were dropped. Although from the theoretical viewpoint either of these two processes may have led to the break-up of LIO relations in the case of shallow complexity clusters, we will hypothesize that the first of these developments had immense impact on the nature of relationships between the consonants involved in these relations. The second step was just a consequence of the first.

Therefore, during the period of Primitive Irish, the word-final short vowels were reduced to schwas, e.g. *LaNda → *LaNdə, *selga → *selgə, *NeRta → *NeRtə. These weakened final nuclei were no longer able to license LIO relations in which the complexity slope between the governors and the governees was shallow. Clusters like [Lt], where the structure of the cluster members was (A, ʔ) + (A-I, ʔ, H), which means that the complexity ratio was (2:3), were relatively steep and easier to government-license. Sequences such as [Ld], whose structure was (A, ʔ) + (A-I, ʔ) and whose complexity ratio equalled (2:2), were difficult (since (A-I) represents only one property, i.e. the place of articulation, we count this combination as one prime). As a result, the break-up of shallow complexity slope clusters occurred. This is shown below:

(59) a. 

→ b. 

In (59a) the cluster [Ld] is still a LIO relation in which the governor (O_2) is licensed by the vowel under (N_2) to govern (O_1). In (59b) the vowel under (N_2) has been reduced to schwa, a segment whose licensing potential is diminished. Due to this, the onset (O_2) is no longer able to perform a LIO government on (O_1) and the intervening nucleus (N_1) is now properly governed by (N_2). The same seems true of the other homorganic clusters such as [Nd], [mb], [ŋg] and heterorganic sequences such as [lg], [rb], etc. On the other hand, all the clusters composed of sonorants followed by voiceless stops, be they homorganic or not, e.g. [lk], [Rt], remained LIO relations because the schwas were capable of licensing steep complexity sequences.

The only sonorant+voiced stop cluster which seems to have survived intact, even to the present day, was [Rd], e.g. Old Irish [aRd], Modern Irish [aːRd] *ard* – 'high'. Its preservation is indubitably connected with the fact that [R] is the weakest of sonorants. Thus, however depleted the licensing potential of the reduced vowel was, this schwa was still able to license LIO relations if the complexity slope was steep enough. In the case of [Rd], the element make-ups were (A) vs. (A-I, ʔ), so the element complexity ratio was (1:2). The homorganicity factor is important here as well because in the case of non-homorganic sonorant+stop clusters, e.g. [rg] or [rb], the steep complexity slope alone was apparently insufficient and, at some period, they developed epenthetic vowels, e.g. Modern Irish [borəb] *borb* – 'rough'.

The next historical step (still in Primitive Irish) was apocope which, according to Kortlandt (1979), McCone (1996), and many others, deleted the final schwa, e.g. *LaNdə → *LaNd, *selgə → *selg, *NeRtə → *NeRt, and left the previously medial clusters 'unprotected' by the following vowels. Thus, clusters such as [Nd], [lg], and [Rt] became word-final in Old Irish, the first of which was soon simplified to [N]. Only Greene (1952:217) tentatively proposes that, soon after this process, vowel epenthesis took place in heterorganic clusters, e.g. [lg], [rb] etc. Given that this vowel insertion is never indicated in the spelling, it must remain hypothetical (Russell 1995:79).

However, from the viewpoint of GP, the standpoint that apocope simply deleted the final schwa and left all the aforementioned clusters at the right-hand edge of the word is problematic. In particular, it was hypothesized above that the only sequences which were able to survive vowel reduction (V → [ə]) as LIO relations were the steep complexity clusters, e.g. [lk], [Rt]. We also assumed that the shallow complexity groups, e.g. [lg], [rv], [Nd], [mb], were decomposed into sequences of independent onsets. In these sequences the intervening nuclei could survive only thanks to Proper Government, as proposed in (59b). If the final nucleus becomes empty ([ə] → [ø]) and cannot serve as a proper governor, the cluster must be split by an epenthetic vowel or altered otherwise.

Taking into account our assumption that, after vowel reduction (V → [ə]), no LIO relations obtained between any clusters except for [Rd] and sonorant+voiceless stop groups, e.g. [lk], [Rt], [lp], [rk], etc., the following question must be answered with respect to apocope ([ə] → [ø]): why were the homorganic sonorant +voiced stop clusters, e.g. [Nd], [mb], simplified to sonorants alone, that is [N], [m], respectively, while nothing allegedly happened to heterorganic sequences of the same kind, e.g. [rg], [nv]?

Within the framework of GP, not all governing relations are said to be equally easily licensed. As mentioned above, LIO relations are considered to be universally easier to license than RIO domains (Charette 1990; Cyran 2003). Also within LIO relations, some clusters are easier to license by the following nuclei than others. Consider the following scale of licensing reproduced after Cyran (2003:112), where (T) stands for any governor, (R) for any governee, (N) for the licensing nucleus while the Greek letters for the phonological primes:

(60) *easy* EASE OF GOVERNMENT-LICENSING *difficult* →

a. ***geminate***	b. ***partial geminate***	c. ***ordinary RT cluster***
R ← T N	R ← T N	R ← T N
. < α	α β	α β
. < β	. < γ	(γ)
. < γ	δ	
[L]	[Ld] [Lt]	[lg] [lb]

This scale shows that geminates (60a), in which the governor (T) is complex, while the governee (R) has zero complexity, are the easiest LIO structures to government-license. Partial geminates (60b) are slightly more difficult to license because only some primes are provided by the governor, while others may be

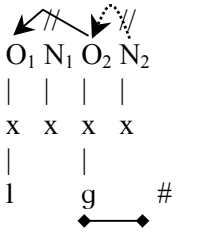
distinctively lodged under the governed position. The most difficult ones are ordinary clusters in (60c), where no element may be shared by the LIO members.

Now, mapping the pre-Old Irish sequences on this scale, we can see that clusters such as [Nd] or [mb], which belong to (60b), are not particularly difficult to government-license, (similarly to [Rt] or [Lt]), while clusters like [rg], [nv] or [lb], must be classified under (60c), which makes them most difficult to license. And yet the latter, e.g. [lb], allegedly survived long after apocope, in the same way as [Lt], while the former, e.g. [Ld], did not.

We must remember, however, that the licensing abilities of nuclei are strictly connected with element complexity, which means that [Ld], whose element ratio is (2:2), is more difficult to license than [Lt], where the ratio is (2:3). The same holds true for the non-homorganic sequences such as [lk], with the ratio of (2:3) vs. [lg], where the ratio is (2:2).

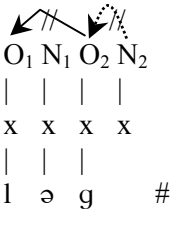
This mathematical calculation, combined with the licensing abilities of nuclei, indicates that, since non-homorganic clusters like [lk], which fit in (60c), survived into Old and Modern Irish, while sequences like [Ld], which are classified under (60b), did not, then the combinations like [lg] should not have remained intact after apocope. If they had survived as [lg], there is something wrong with the universal scale in (60). If they had not, they cannot have been clusters in Old Irish. Thus, there are two theoretical possibilities at our disposal: (a) the final stops were dropped, e.g. *selgə → *selg → *[sel], which does not seem to have been the case, or (b), the heterorganic final clusters like [lg], [nv] or [rb], were split by epenthetic vowels, i.e. *selgə → *selg → [seləg]. These two options are schematized below:

(61) a.



REDUCTION

b.



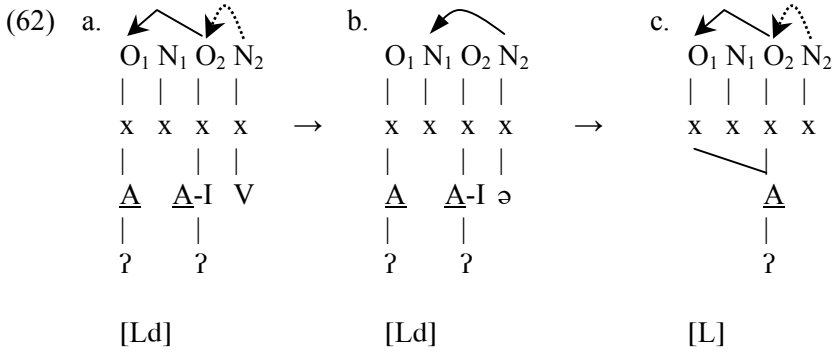
In (61a) we can see a hypothetical inability of (N_2) to license LIO between (O_2) and (O_1). As a consequence, both (N_1) and (N_2) surface as unlicensed empty nuclei, which violates one of the fundamental assumptions of GP: a sequence of two unlicensed empty nuclei is ruled out. The inevitable structural reduction means that both (N_2) and (O_2) are removed from the structure, while (N_1) remains as a domain-final empty nucleus capable of licensing the preceding liquid.

In (61b) we also see the absence of prosodic government-licensing from (N_2) to (O_2), due to which LIO between (O_2) and (O_1) is impossible. However, (O_2) is licensed by the empty (N_2) to remain in the structure provided that it has no LIO duties. Here the epenthetic vowel [ə] splits the cluster.

Now, taking into account the fact that the option shown in (61a) finds no confirmation in the subsequent development of the language, i.e. the pre-Old Irish *selgə → Modern Irish [s^{i}el^{i}ig^{i}] *seilg* – 'hunt', the other (61b) possibility must be accepted for the time being. We will try to see whether our theoretical solution can find verification in the ensuing sections, where the behaviour of consonant clusters in the mediaeval Irish verse is presented. Before this is done, however, let us consider why the homorganic clusters, e.g. [Nd], were unable to survive intact after apocope.

Our theoretical considerations indicate that, after apocope, the structure of all shallow complexity clusters, both homorganic and heterorganic, must have been somewhat altered. In the case of heterorganic sequences, e.g. [lg], vowel epenthesis seems a plausible solution, as proposed in (61b). Unfortunately, in the case of homorganic sequences, e.g. [Ld], no epenthesis can be postulated for at least one reason. Knowing that combinations such as [mb], [Nd], [ŋg], [Ld], were simplified to [m], [N], [ŋ], [L], respectively, in or before Old Irish, and that the Old Irish tense resonants can be viewed as geminates, as suggested in (56), we may suspect that the simplification of consisted in the gemination of the resonants. This hypothetical simplification is represented below (we repeat the earlier development, i.e. the break-up of LIO for convenience):

(62)



The representation in (62a) shows LIO between (O_2) and (O_1). This relation is absent in (62b) with no phonetic consequences for the cluster [Ld]. The intervening nucleus (N_1) is now properly governed by the schwa under (N_2). In (62c), after apocope, the final schwa under (N_2) is now an empty nucleus which cannot properly govern the preceding (N_1). Taking into account that there was no epen-

thesis under (N_1) and that the final dental was dropped, we can assume that the system chose gemination (progressive assimilation) instead of vowel insertion. The crucial factor seems to be the fact that we are dealing here with a sequence of homorganic coronal segments where relatively many elements are shared by the element make-ups of both [L] and [d].

This proposal has at least two advantages. First, it is in agreement with the universal scale shown in (60), according to which geminates are the easiest LIO relations to license by the following nuclei. Thus, the licensing nucleus can even be empty. Second, given the representation in (62c), it is now possible to interpret the Modern Irish lengthening before the tense sonorants in terms of geminate decomposition, as shown in (55). In particular, the prehistoric words ending in tense sonorants followed by homorganic voiced stops did not only lose the final stops, but also experienced the gemination of the tense sonorants at the expense of the disappearing stops. Thus, the tenseness of resonants, previously provided by LIO obtaining between sonorants and following homorganic stops, as proposed in (58b, c), was preserved due to the double linking, as suggested in (62c), and establishing new LIO relations.

To sum up, the adoption of the model of licensing and complexity leads us to assume that steep complexity clusters, e.g. [lk], [Rt], were still LIO relations in Old Irish. Besides, shallow complexity homorganic clusters, e.g. [mb], [Ld], were simplified to sonorant geminates [m], [L], respectively, as proposed in (62c). Considering that the heterorganic sequences like [lg] or [rb] cannot have survived as true clusters after apocope, it was suggested in (61b) that vowel epenthesis is theoretically the most plausible solution.

Now, let us see whether the relevant literature can in any way support these theoretical assumptions.

3.2.17. The development of Irish vowel epenthesis

The history of Irish vowel epenthesis, also referred to as svarabhakti or anaptyxis, is enshrouded in mystery. In particular, it cannot be ascertained beyond any doubt when exactly this phenomenon occurred in the development of the language. The Old Irish spelling suggests that consonantal sequences such as, say, [lk] and [Rt], e.g. *olc* – ‘bad’ and *gort* – ‘field’, were true clusters which can be treated on a par with combinations like [lg] or [rb], e.g. *selg* – ‘hunt’ and *borb* – ‘rough’. In Modern Irish, however, the spelling is almost identical as that in Old Irish, svarabhakti is never indicated, and yet it occurs only in the latter group, e.g. [s^{i}el^{i}ig^{i}] *seilg* – ‘hunt’ and [borəb] *borb* – ‘rough’ (Ó Siadhail 1989; Ní Chiosáin 1997:371). This amounts to saying that the orthography, both past and present, may be misleading and anaptyxis may have been present in the language

much earlier than it is commonly assumed. In other words, there is no objective way of finding out when the insertion of schwas occurred in the heterorganic clusters composed of sonorants followed by voiced obstruents.

The first type of svarabhakti and, at the same time, the only one for which there is tangible evidence, is that which occurred immediately before Old Irish and just after apocope and syncope, the final developments of Primitive Irish. In particular, when these two processes gave rise to a structure where a word-final sonorant followed an obstruent, an anaptyctic vowel divided such a sequence (McCone 1996:127), e.g. *do͡v̂na → (apocope) *do͡v̂n → (svarabhakti) [do͡v̂ən] *domun* – 'world', *araθra → (apocope) *araθr → (svarabhakti) [arəθər] *arathar* – 'plough'. This epenthesis is by all means logical given that RIO had not been part of the system at that time and the domain-final empty nucleus could not properly govern the empty slot between the obstruent and the sonorant.

No other type of epenthesis has ever found its reflection in the spelling, however, not even in Modern Irish, whose spelling conventions are said to be as close to the phonetic reality as possible. Thus, there is no real clue as to the time when the so-called Modern Irish epenthesis in words like [borəb] *borb* – 'rough' first occurred. What we know for sure is that it does take place in Modern Irish.

There are a few opinions that svarabhakti was present in Irish since the earliest times. Green (1997:164) dates the phenomenon of svarabhakti in clusters of falling sonority between the periods of Old and Early Modern Irish, which is somewhat imprecise. Ó Baoill (1980:95ff.) claims that it was already present in Old Irish and that it developed as a result of simplifying geminate stops following the sonorants. Specifically, word-final voiced stops were historically geminates whose first part was later vocalized after resonants.

Much more convincingly, Greene (1952) argues that svarabhakti in heterorganic clusters, that is, in words such as [bolg] *bolg* – 'belly', occurred as early as after apocope and syncope, the processes which took place in late Primitive Irish. However, he claims that this svarabhakti cannot be comparable to that occurring in Modern Irish. Referring to O'Rahilly's (1932:199ff.) description of a peculiar type of epenthesis which took place in Scottish Gaelic stressed verse, Greene proposes that the Old Irish epenthesis in these clusters can be referred to as 'svarabhakti of the Scottish type'. Briefly, in a monosyllabic word like [boləg] *bolg* – 'belly', a vowel splits the final consonant sequence but the whole word is still treated as monosyllabic. On the other hand, the Modern Irish version of [boləg] is clearly disyllabic. Thus, it is likely that the Old Irish *bolg* – 'belly' was pronounced more or less as [bolˀg]. This proposal makes it possible for Green to postulate the existence of three types of monosyllables in Old Irish. These will be presented in the following section.

3.2.18. Word-final clusters in Irish poetry

Greene (1952:212-218) observes that in Old Irish literature, and particularly in poetry, diverse consonantal groups were treated differently for rhyming purposes. In Irish poems, rhyming vowels had to agree with respect to quantity and (usually) quality. As for consonants, not every consonant or consonant group could rhyme with another one. Analyzing Thurneysen's (1949:37-38) account of Old Irish metrics, where the details of rhyming are presented, Greene observes that before certain types of clusters, that is, mainly before homorganic and heterorganic sonorant+voiced obstruent sequences, the length mark, e.g. *é*, frequently appears over vowels traditionally considered as short, e.g. *cénd* for the more common version *cen(d)* – 'head' or *férg* for the regular *ferg(g)* – 'anger'. This scribal practice was probably used to indicate that the syllable with such a vowel was considered to sound longer than that containing a short vowel, although it was not equal to one with a truly long vowel or diphthong. Greene discards the view that there was a three-way quantity distinction in Old Irish VOWELS. Instead he suggests that this scribal practice helped indicate SYLLABLES which were neither fully long (containing a true long vowel or a diphthong) nor short (containing a short vowel followed by clusters composed of resonants or voiceless fricatives followed by voiceless stops). Therefore, on the basis of metrical behaviour, Greene (1952:218) concludes that there were three types of monosyllables in Old Irish.

The first type, which will be referred to as type A, contains long syllables. These are composed of long vowels or diphthongs followed by one consonant, a geminate sonorant, or a 'light consonant group' (a voiceless fricative+voiceless stop sequence). Representative examples are given below:

(63) TYPE A

[k^{i}iaL]	*cíal(l)*	– 'sense'	[es^{i}k^{i}]	*éisc*	– 'fish'-gen.sg.
[sRo:n]	*srón*	– 'nose'	[g^{i}e:s^{i}]	*géis*	– 'swan'
[su:l^{i}]	*súil*	– 'eye'	[e:χt]	*écht*	– 'slaughter'

Interestingly, words from the group in (63) above can rhyme only with members of their own set (obviously when the vowels and consonants are more or less the same and the consonantal cluster is the same quality as regards palatalization).

The second set, called group B here, comprises short syllables, that is, short vowels followed by one consonant or a 'light' consonant cluster. Consider the representative cases of this group:

(64) TYPE B

[f^{i}er]	*fer*	– ‘man’	[eχ]	*ech*	– ‘horse’
[kat]	*cat(t)*	– ‘cat’	[d^{i}erk]	*derc*	– ‘hole’
[olk]	*olc*	– ‘bad’	[korp]	*corp*	– ‘body’
[foLt]	*folt*	– ‘hair’	[l^{i}esk]	*lesc*	– ‘lazy’
[t^{i}eχt]	*techt*	– ‘going’	[N^{i}eRt]	*nert*	– ‘strength’

Similarly to what can be seen in (63), the items included in (64) can rhyme only with members of the same group. In particular, a single consonant can rhyme with another single consonant or with a cluster, while a cluster can rhyme with another sequence or with one consonant (if the consonants agree with respect to palatalization or its absence and that the vowels are alike).

It is important to note that there are melodic restrictions on the rhyming consonants and not every cluster can rhyme with a single consonant. For example, [Rt], [Lt], [χt] can rhyme with [t] or [k], but it is unlikely for [r] to rhyme with [Rt] or any other cluster. A lax sonorant like [r] can rhyme with another lax sonorant, e.g. [l]. Therefore, the type of the final consonant matters for the rhyming abilities.

The next group, that is type C, contains the so-called half-long syllables. These are composed of a short vowel followed by a tense sonorant and, optionally, a homorganic voiced stop. Consider the following cases.

(65) TYPE C

[f^{i}eR]	*ferr*	– ‘better’			
[baL]	*ball*	– ‘limb’			
[RaN]	*rann*	– ‘part’			
[tom]	*tom(m)*	– ‘bush’			
[aRd]	*ard*	– ‘high’			
[m^{i}eLd]	*meld*	– ‘pleasant’	also	[m^{i}eL]	*mell*
[k^{i}eNd]	*cend*	– ‘head’	also	[k^{i}eN]	*cenn*
[kamb]	*camb*	– ‘crooked’	also	[kam]	*cam(m)*
[s^{i}eŋg]?	*seng*	– ‘narrow’	or	[s^{i}eŋ]?	

There is also the other set of half-long syllables, whose members can rhyme with items from group C. This second set, referred to as type D, also contains short vowels, similarly to type C. The vocalic segments in type D are followed by ‘heavy consonant groups’, i.e. sequences of resonants or the voiced fricative [ð] preceding non-homorganic voiced obstruents (including [m] after a sonorant or [ð], and [N] after [R]).

(66) TYPE D

[borb]	*borb*	– ‘rough’	[b^{i}eðg]	*bedg*	– ‘leap’
[d^{i}elv]	*delb*	– ‘image’	[salm]	*salm*	– ‘psalm’
[f^{i}eðv]	*fedb*	– ‘widow’	[an^{i}m^{i}]	*ainm*	– ‘name’
[d^{i}erg]	*derg*	– ‘red’	[maðm]	*madm*	– ‘breaking’
[bolg]	*bolg*	– ‘belly’	[doRN]	*dornn*	– ‘fist’

Let us now consider a few representative examples of rhyming pairs taken from Stokes and Strachan (1903), Thurneysen (1949), Greene (1952), Murphy (1956), and Best and O’Brien (1954-67). In these cases (V) stands for ‘vowel’ while (V:) represents ‘long vowel’ or ‘diphthong’:

(67)

TYPES		EXAMPLES	TYPES		EXAMPLES
A) V:L	- V:n	*cíall – Brían*	B) VLt	- Vχt	*folt – (in)nocht*
V:s	- V:st	*tís – Chríst*	VL^{i}t^{i}	- Vk^{i}	*nailt – maicc*
V:ð	- V:θ	*rád – (co)bráth*	Vr^{i}p^{i}	- Vl^{i}k^{i}	*cuirp – uilc*
			Vr^{i}k^{i}	- Vk^{i}	*uirc – bruic*
			Vt^{i}	- VR^{i}t^{i}	*duit – guirt*
C) VN	- VNd	*Minn – (Loth)lind*	D) Vðv	- Vrv	*Badb – marb*
VL^{i}d^{i}	- VR^{i}d^{i}	*meild – (fo-)ceird*	Vr^{i}m^{i}	- Vn^{i}m^{i}	*airm – ainm*
Vm	- VNd	*(inda)limm – (barr)find*	Vð^{i}m^{i}	- Vl^{i}m^{i}	*feidm – deilm*
VL^{i}	- Vng^{i}	*chuill – druing*	Vðg	- Vrg	*bedg – ferg*

C-D)	VR^{i}d^{i}	- Vl^{i}g^{i}	*(sain)cheird – seilg*
	VNd	- Vlm	*cend – (Fe)delm*
	VRd	- Vrv	*ard – borb*
	VR	- Vlg	*corr – colg*

The picture above is clear. The examples from (67A) rhyme only with the members of their own set. The same refers to the cases in (67B). On the other hand, the words from (67C) and (67D) can constitute rhyming pairs. From the metrical point of view, this indicates that the structures of items from (67C) and (67D) are perceived as identical, while the other two groups, that is (67A) and (67B), are dissimilar both to each other and to the remaining two groups.

It should be emphasized that rhymes presented in (67) are by no means the most desired. Similarly to any type of verse, the mediaeval Irish poetry preferred rhymes like, e.g. *céin – féin* (type A), *cacht – acht* (type B), *lainn – clainn* (type C) or *ferg – derg* (type D). However, since words selected for artistic purposes

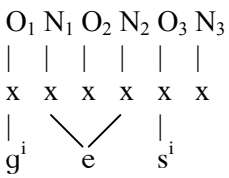
could not invariably rhyme perfectly, the rhyming of only certain combinations was allowed. In the next section we will see whether these metrical observations can contribute to the understanding of the nature of word-final clusters.

3.2.19. Phonological representations of rhyming groups

Now we can compare the rhyming patterns presented in the previous section with our analysis of the word-final consonant clusters in and before Old Irish advocated in (3.2.15.) and (3.2.16.) above.

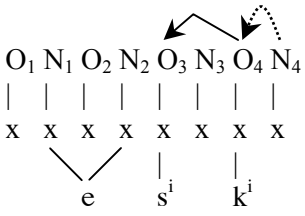
Words from group A, which contain long vowels or diphthongs, have not been analyzed yet. It is crucial to remember that the long vowels or diphthongs can be followed by single sonorants, e.g. [su:l^{i}] *súil* – 'eye', by obstruents, e.g. [g^{i}e:s^{i}] *géis* – 'swan', by sonorant geminates, e.g. [k^{i}iaL] *cíal(l)* – sense', or by 'light consonant groups', e.g. [e:s^{i}k^{i}] *éisc* – 'fish'-gen.sg. So far we have been maintaining that both sonorant geminates and consonant clusters composed of voiceless spirants preceding voiceless stops should be viewed as LIO relations. Following this line of reasoning, consider the representations below:

(68) a.



[g^{i}e:s^{i}]

b.



[e:s^{i}k^{i}]

In (68a) the long vowel [e:] is attached to two nuclei (N_1) and (N_2). The third nucleus (N_3) is a domain-final unburied nuclear position. In (68b) the long vowel [e:] is linked to two nuclei (N_1) and (N_2). Moreover, we can observe a LIO relation between (O_4) and (O_3), which is licensed by the domain-final empty nuclear slot (N_4). This LIO relation buries the intervening nucleus (N_3).

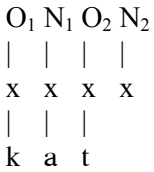
On the face of it, these two structures are totally dissimilar. However, if we adopt the view that what counts for the metrical pattern is the number of nuclei in a given word, these representations need no longer be viewed as different. In particular, the structures in (68a) and (68b) both contain three nuclei visible to phonology and, hence, to metrical count. In (68a) the first two nuclei are filled with melody, while the domain-final slot is empty but unburied. In (68b) the first two nuclei are also filled with melody, the third one is buried and invisible to the phonological structure, whereas the domain-final position is empty but unburied. Thus, the two structures in (68) are metrically identical and they can rhyme with

each other. As for sonorant geminates, e.g. [k^{i}iaL] *cial(l)* – 'sense', their structure parallels that shown in (68b), that is, they must be viewed as LIO relations.

Now let us turn to group B. In this collection, short vowels can be followed by one consonant, be it a sonorant, e.g. [f^{i}er] *fer* – 'man', or an obstruent, e.g. [kat] *cat(t)* – 'cat', or by a 'light' consonant cluster, i.e. a voiceless fricative followed by a voiceless stop, e.g. [t^{i}eχt] *techt* – 'going', a sonorant followed by a homorganic voiceless stop, e.g. [saLt] *salt* – 'leap', or a sonorant preceding a heterorganic voiceless stop, e.g. [olk] *olc* – 'bad'.

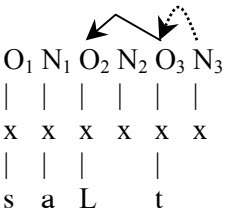
In the present analysis all these clusters have been regarded as classic instances of LIO relations. Compare the following representation of a word ending in a single voiceless consonant (69a) and that of an item ending in a so-called 'light' cluster (69b):

(69) a.



[kat] *cat(t)*

b.



[saLt] *salt*

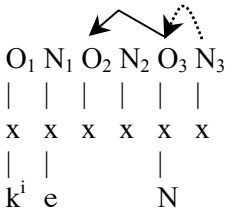
In (69a) the nucleus (N_1) contains a vowel, while the second one (N_2) is domain-final and unburied. Thus, two nuclei are visible to the phonological structure. In (69b), since the nucleus (N_2) is excluded due to its being buried, there are also two nuclei visible to phonology, that is, (N_1) containing a vowel, and (N_2) – domain-final and unburied. Therefore, these representations can be revealing if we adhere to the view that what matters for metrics is the number of nuclei visible to phonology.

The structures in (68) and (69) above show why words ending in single consonants can rhyme with lexical items ending in LIO clusters. It should be borne in mind, though, that we are talking about structures and not the actual clusters. In other words, [f^{i}er] *fer* – 'man' will never rhyme with [olk] *olc* – 'bad', because the vowels are different and the final consonants belong to two different classes (sonorants vs. obstruents) but [saLt] *salt* – 'leap' can rhyme with [kat] *cat* – 'cat' (both words end in voiceless stops), while [for] *for* – 'on' can rhyme with [tol] *tol* – 'will' (both words end in sonorants). Now we will turn to the more complicated problem, namely to groups C and D.

If we now follow our assumption from (3.2.16.) and maintain that the orthographic sequences such as [Ld], [mb], [Nd], and [ŋg] represent actual sonorant

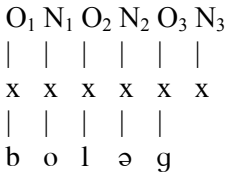
geminates, while combinations like [lg], [rb], [nv], etc. do not stand for true clusters but for ones split by svarabhakti vowels, the phonological structures of representative cases of groups C and D must be as follows.

(70) a.



[k^{i}eN] *cen(d)*

b.



[boləg] *bolg*

These representations are by no means identical. In (70a) we can observe a LIO relation between (O_3) and (O_2), which is licensed by the domain-final unburied (N_3). The nucleus (N_2) is buried by this LIO domain. Thus, two nuclei, that is, (N_1) and (N_3) are visible to phonology. In (70b), on the other hand, there is an epenthetic vowel under (N_2) and, as a result, three nuclei are unburied and visible to the phonological structure.

Therefore, the structure in (70a) should be able to rhyme with those in (69), while that in (70b) ought to be different from both (70a) and (69). And yet the mediaeval verse perceived both the structures in (70) as rhyming.

At this juncture, we must ask and answer the following questions. First, is the assumption that epenthesis occurs in (70b) erroneous? Second, is the hypothesis that sequences such as [Nd] are geminate sonorants wrong? Third, is the mediaeval rhyming pattern based upon the state of affairs present in the system of Old Irish or does is follow other rules?

Firstly, let us compare the word *bolg* – 'belly', which we deem to have been pronounced as [boləg], with [bog] *boc* – 'soft'. Given that these two words can never rhyme, which would be the case if *bolg* were pronounced as [bolg] (by analogy with the rhyming pair of [guR^{i}t^{i}] *guirt* – 'field'-gen.sg. and [dut^{i}] *duit* – 'to you' in (67), we can answer the first question in the negative.

Secondly, the formation of geminate sonorants which resulted from the simplification of clusters such as [Ld], [mb], [Nd], and [ŋg] (progressive assimilation) between Primitive Irish and Early Old Irish can hardly be questioned given that the phonological system at that period was unable to support shallow complexity clusters and that their subsequent development shows the survival of these resonants as geminates up to the present.

Thirdly, the question of what mattered for mediaeval poetry cannot be unequivocally answered on the basis of Old Irish alone. However, let us consider

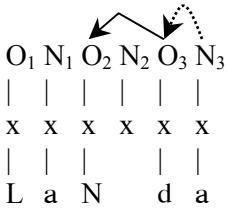
Greene's (1952:217) remark concerning the nature of rhyming patterns discussed here: "As happens so often in Irish, the literary usage reflects the linguistic facts of many centuries before".

Pursuing this observation, let us return to late Primitive Irish developments described in detail in (3.2.16.) and look for rhyming patters within that period.

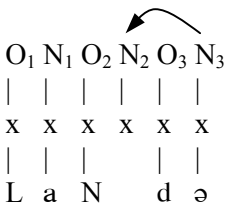
3.2.20. Prehistoric rhyming patterns at work

In (3.2.16.) we discussed the break-up of shallow complexity slope clusters, both homorganic, e.g. [Nd], and heterorganic, e.g. [lg]. We attributed this process to the fact that the word-final short vowels were reduced to schwas and the licensing potential of these weakened vowels was insufficient to license shallow complexity LIO relations. Let us now compare the structures of homorganic (71a, b) and heterorganic (71c, d) clusters from that period.

(71) a.

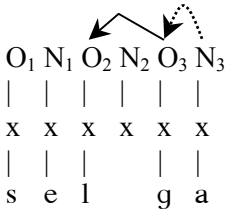


→ b.

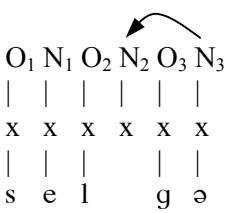


*LaNda → *LaNdə

c.



→ d.

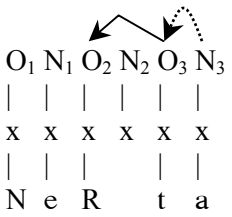


*selga → *selgə

In (71a) and (71c) we can see that the relevant clusters, that is [Nd] and [lg], respectively, are followed by full vowels under (N_3) and they display LIO relations between (O_3) and (O_2). The structures in (71a) and (71c) are thus the same. In (71b) and (71d) we can see the situation after the reduction of the final vowel under (N_3) to schwa. This reduction results in the break-up of LIO in both cases, and the application of Proper Government between (N_3) and (N_2). The representations in (71b) and (71d) are also identical. We can claim, therefore, that these structures must have been taken into account while establishing the rhyming patterns of the verse. Note that in both these structures three nuclei are visible to

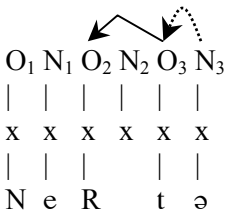
phonology, (N_2) being empty but unburied. The hypothesis that types C and D were identical and differed from type B only at this stage can be confirmed when we have considered the following development:

(72) a.



→

b.



*NeRta → *NeRtə

The representation in (72a) is identical to those in (71a) and (71c), which means that, before the reduction of final vowels to schwas, all the sonorant+stop clusters were LIO relations. This situation changed after the time when schwas replaced full vowels in word-final position. The shallow complexity clusters, as shown in (71b, d) ceased to be LIO relations, while steep complexity sequences, as proposed in (72b), remained intact. In both (72a) and (72b) the number of nuclei visible to phonology was two, (N_2) being locked by LIO. This must have been the crucial difference between type B on the one hand and types C and D on the other, where three nuclei were visible to phonology when the final vowels were reduced to schwas.

Since no other stage in the development of these three types of clusters can be regarded as one when the rhyming patterns were established, we can conclude that, if phonological structure had anything to do with rhymes, then, indeed, the mediaeval verse reflected the linguistic facts from many centuries before Old Irish, namely from late Primitive Irish.

A word or two should now be said about prehistoric double sonorants which had never preceded stops and which still belong to our type C, e.g. [koL] *coll* – 'hazel' (Proto-Celtic *koslo-), [b^{i}eN] *benn* – 'peak' (PC *banno-), or [kaR] *carr* – 'wagon' (PC *karso-). In the light of our proposal as regards the time when the rhyming patterns were established, it is not clear why items like these can rhyme with words which contained prehistoric clusters, e.g. [LaN(d)] *lan(d)* – 'open space' (PC *landa). One reason may be that there was much confusion in the treatment of original clusters and that the original double resonants in words like [b^{i}eN] *benn* – 'peak' were reinterpreted not as ones originating from the Proto-Celtic form *banno- but from the non-existent *bando-.

Another cause may be that words such as [koL] *coll* – 'hazel' were interpreted as ones in which there were no true geminates but simply sequences of two

identical sonorants. Given that the vast majority of Old Irish sonorant geminates originate from sequences of sonorants and other segments, e.g. the orthographic *nn* is derived from PIE **sn*, **ndn*, or **nd* (Thurneysen 1946: 95), we may suspect that the Primitive Irish system treated the double sonorants in, say, *bannə, in the same way as it perceived *landə and it was only after the dropping of final schwas that levelling occurred and both these sequences became LIO-geminates.

Finally, it might be assumed that words like [koL] *coll* – 'hazel' or [b^{i}eN] *benn* – 'peak' joined the rhyming groups when these were already established and the original geminate sonorants were just identical with the ones resulting from the simplification of sonorant+stop clusters.

Be that as it may, the mediaeval verse viewed Primitive Irish double sonorants on a par with sequences of tense sonorants followed by homorganic stops and, at this stage, there is no way of knowing which of the causes presented above was the decisive factor.

To sum up, let us emphasize that the licensing model forces us to say that the rhyming system makes most sense if it was established at the stage when the words which displayed final sonorant+obstruent clusters in Old Irish ended in the vowel [ə]. Neither an earlier nor a later stage appears logical if we assume that the metrical count had something to do with the phonology of the language.

Now, given that svarabhakti seems tenable in the alleged word-final heterorganic clusters, e.g. [lg], while gemination appears justifiable in homorganic sequences which occur in final position, e.g. [N], we will see whether these two phenomena can be postulated in word-medial clusters belonging to these two types. Let us recall that the Old Irish heterorganic word-medial sequences, e.g. [argəd] *argat* – 'money', display epenthesis in Modern Irish, i.e. [ar^{i}ig^{i}əd] *airgead*), while the Old Irish medial homorganic clusters, e.g. [k^{i}eN(d)a] *cen(d)a* – 'heads', show only simplification in Modern Irish, i.e. [k^{i}aNə] *ceanna*.

3.2.21. Word-medial falling-sonority clusters – conclusion

It is time we concluded our discussion devoted to word-medial falling-sonority sequences. In (3.2.13.) above it was argued that steep complexity sequences occurring in the middle of the word, e.g. [Rt], should be viewed as LIO relations. Our findings confirm this view because if LIO can be postulated in word-final position, where the domain-final empty nucleus is able to license such sequences, a realized vowel in the middle of the word must be capable of performing the same job. This results from the theory-internal assumption that vowels are universally better and stronger licensers than empty nuclear positions. Thus, in both [goRte] *gortae* – 'famine' and [goRt] *gort* – 'field', LIO obtains between the voiceless stops and the preceding segments.

If we now turn to the gemination of sonorants, which we propose to have originated in word-final sequences such as **mb* → [m] or **Nd* → [N], we can assume that similar developments took place in identical word-medial clusters by analogy. So, once *im(b)* – 'butter' started to be pronounced as [im] in the nominative, the other cases followed suit although there was a vowel following the cluster, i.e. [imb^{i}e] → [im^{i}e] *im(b)e* – 'butter'-gen.sg. Besides, given that there was some confusion between the original sonorant+stop sequences, e.g. **Nd*, and prehistoric double sonorants, e.g. **nn*, which led to fluctuation in Old Irish, e.g. Proto-Celtic *landa → O.Ir. [LaN(d)] *lan(d)* – 'open space' vs. Proto-Celtic *k^{w}ennom → O.Ir. [k^{i}eN(d)] *cen(d)* – 'head', it is likely that both medial and final orthographic sequences such as *nd*, *mb*, *ng* and *ld* represented the same phonological objects in Old Irish, that is [N], [m], [ŋ], and [L], respectively. This assumption cannot be proved or disproved, but it is logical.

Lastly, the word-final svarabhakti clusters like [rg], e.g. [d^{i}erəg] *derg* – 'red', and their medial congeners, e.g. [argəd] *argat* – 'money', escape simple explanation. In (3.2.16.) it was proposed that in final heterorganic clusters of shallow complexity two prehistoric developments should be viewed as particularly important. First, there was a reduction of the prehistoric short vowel to schwa, i.e. *derga → *dergə. This reduction led to the break-up of a LIO relation between the sonorant and the following voiced stop and the Proper Government of the intervening nucleus by the final schwa. And second, there occurred the deletion of schwa, i.e. *dergə → *derg, which resulted in a cluster that could not be government-licensed by a domain-final empty nucleus. This situation caused the appearance of a svarabhakti vowel, i.e. *derg → [d^{i}erəg] *derg* – 'red'. In the case of [argəd] *argat* – 'money', the cluster [rg] was also followed by an unstressed vowel (most probably a schwa), which must have resulted in the break-up of the prehistoric LIO and the application of Proper Government. Given that there were no final schwas in Old Irish, it is difficult to state whether the medial [ə] was a good proper governor in this system. In (3.2.12.), while discussing the so-called Modern Irish secondary epenthesis, e.g. O.I. [egne] *ecne* → Mod.Ir. [agənə] *eagna* – 'wisdom', we hypothesized that some schwas need not be proper governors. However vague this assumption may be, it seems that the epenthesis in the Mod.Ir. [ar^{i}ig^{i}əd] *airgead* – 'money' may be caused by the inability of the rightmost schwa to properly govern the preceding schwa. As regards establishing an earlier date, the above analysis of epenthesis does not allow us to state whether svarabhakti in words such as [ar^{i}ig^{i}əd] took place as early as in Old Irish or later.

3.2.22. Word-medial triconsonantal sequences

The remainder of this chapter will be devoted to an analysis of ternary consonantal combinations which occur in medial position in Old Irish words. We will try to discover whether any governing relations obtain in these sequences. The point of departure is the assumption that LIO takes place if it can, while RIO is absent from the system.

While describing ternary combinations in the introduction, we observed that they are difficult to capture in terms of regularity. However, given our findings concerning complexity profiles and governing relations in binary sequences from the previous sections, we could divide these triconsonantal clusters into five groups. In the division below, where the exemplary clusters from (23) are repeated along with a broader selection of data, (T) represents a governor in an interonset relation, while (R) stands for a governee.

(73) a. LIO + R/T

[skn] *:ta**scn**ai* – 'approach' (3 sg. dependent verbal form of *do:ascnai*)
[skv] *me**scb**aid* – 'quarrel' or *me**sb**aid*
[Rtχ] *for**tch**ed* – 'covering'
[Ltr] *go**ltr**aige* – 'a kind of music which moved those who heard it to sorrow and tears'

b. LIO-gemination + R

[Ndn] *ti**ndn**acol* – 'giving' (verbal noun of *do:indnaig*) or *ti**nn**acol*
[mbr] *cui**mbr**e* – 'brevity' or *cui**mr**e*

c. RəT + R/T

[rgv] *tu**rcb**áil* – 'lifting' (verbal noun of *do:furgaib*)
[rmn] *fo**rmn**a* – 'shoulder'
[rmd] *fo**rmt**ech* – 'envious'

d. T/R + LIO-gemination

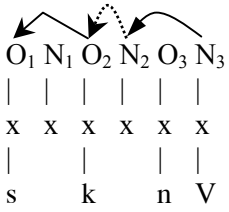
[vNd] *scrí**bnd**id* – 'scribe' or *scrí**bd**id* or *scrí**bn**id*
[gNd] *fre**cnd**airc* – 'present' or *fre**cd**airc* or *fre**cn**airc*
[Rŋg] *tai**rng**ire* – 'promise' (verbal noun of *do:airngir*) or *tai**rg**ire*

e. T/R + T/R + R

[θχr] *tai**thchr**ecc* – 'redeeming' (verbal noun of *do:aithchren*)
[χsL] *do:fo**chsl**a* – 'seize'
[RsN] *cota**rsn**ae* – 'contrary'

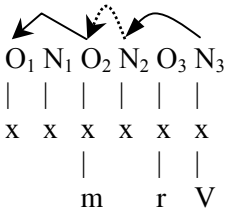
The ternary clusters above represent five different patterns. The sequences in (73a) display typical LIO relations, which are followed by one segment, be it an obstruent, e.g. [Rt+χ] or a resonant, e.g. [sk+n]. The combinations in (73b), e.g. [m+br], display a similar structure. Taking into account that the orthographic *mb* probably stood for a geminate labial sonorant, as proposed in (3.2.19.), we may assume the presence of LIO here as well. Consider the following structures:

(74) a.



[skn]

b.

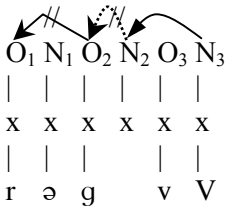


[mr]

In (74a) we can see that a LIO relation obtaining between the governor (O_2) and the governee (O_1), which is licensed by the empty unburied (N_2), buries the intervening nucleus (N_1), similarly to word-initial clusters, e.g. [ska:θ] *scáth* – 'shadow', [s^{i}k^{i}r^{i}ed] *scret* – 'scream', or word-final sequences of this type, e.g. [m^{i}esk] *mesc* – 'confusion'. The vowel under (N_3) properly governs (N_2). The same mechanisms can be observed in (74b). Thus, whether we are dealing with a geminate sonorant [m], or with an archaic cluster [mb] followed by another consonant in Old Irish does not matter. A LIO relation obtains between (O_2) and (O_1). The vowel under (N_3) properly governs (N_2), which is the licenser for LIO, similarly to the situation in [im] *im(b)* – 'butter'.

The combinations in (73c), e.g. [rgv], apparently represent svarabhakti clusters. Given that sequences such as [rg] must appear before an empty nucleus in [rg+v], the following representation can be offered:

(75)

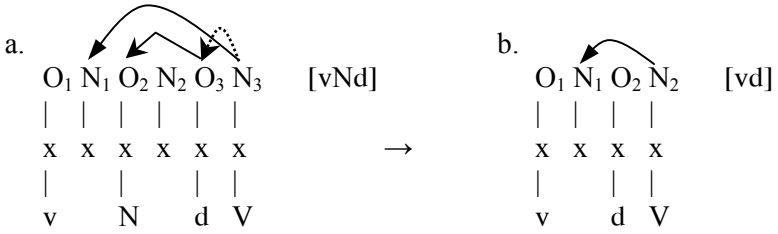


The vowel under (N_3) properly governs (N_2), which, by virtue of being empty, is unable to license a difficult type of LIO between (O_2) and (O_1). The absence of LIO causes the appearance of the svarabhakti vowel under (N_1). The situation in (75) resembles that in words like [boləg] *bolg* – 'belly' and [f^{i}erəg] *ferg* – 'anger' in that the sonorant+voiced stop sequence occurs before an empty nucleus.

Both here and in word-final position, the empty nucleus is too weak a licenser to sanction a shallow complexity LIO relation between a non-homorganic voiced stop and the preceding resonant.

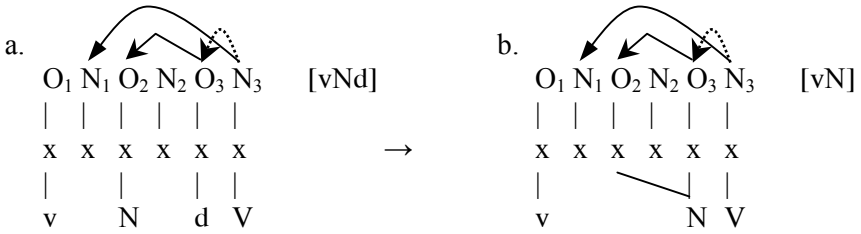
If we now turn to the exemplary clusters form (73d), e.g. [Rŋg] or [vNd], the fact that words in which they are contained have simplified doubles, e.g. [vd] or [vN] for [vNd], is puzzling. We may suspect that either the phonological system of Old Irish felt 'uneasy' about such sequences and deleted sonorants, i.e. [vNd] → [vd], or that the geminated sonorants were replacing the previous resonant +voiced stop clusters, i.e. [vNd] → [vN]. These two options are shown below:

(76)



Above we can see the simplification of the pre-Old Irish [vNd] to [vd]. In (76a) the vowel under (N_3) licenses LIO between (O_3) and (O_2), and properly governs (N_1). Taking into account that (N_2) is buried and invisible to phonology, Proper Government can apply here.[15] When the sonorant is dropped in (76b), regular Proper Government obtains between (N_2) and (N_1). The other simplification is represented below:

(77)



In this development the only change is melodic. The LIO relation between (O_3) and (O_2) in (77a), that is, between a stop and the preceding sonorant, is replaced by LIO-gemination in (77b), where the geminate sonorant occupies two consecutive onsets. The other relations, i.e. the licensing of LIO by (N_3) and Proper Government between (N_3) and (N_2), remain unchanged.

[15] Such an application of Proper Government has been proposed for ternary sequences in Polish by Gussmann and Kaye (1993) as well as Gussmann and Cyran (1998).

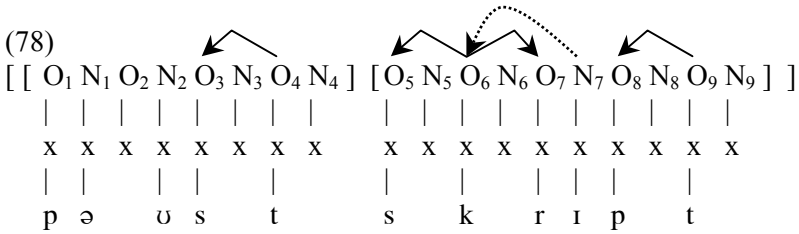
Lastly, the triconsonantal clusters belonging to the group in (73e), namely [θχr], [χsL] and [RsN], look like word-initial binary sequences, i.e. [sL], [sN] or [χr] (historically lenited [kr]), preceded by single consonants. This observation suggests that we may be dealing with morphologically complex structures, i.e. compounds. Most examples in (73) seem to be composed of more than one morpheme, but we have been able to analyze the first four groups without resorting to the concept of morphological complexity because the governing relations which occur within these words are comparable to those which obtain in binary sequences. Now, given that so far we have not discovered any governing relations in any word-initial obstruent+sonorant sequences, e.g. [χr], we cannot propose representations of these clusters which would comparable to those in (74-77) above. What we need is an analysis which takes into account morphological complexity. This will be done in the ensuing section.

3.2.23. Morphological boundaries and ternary clusters

Kaye (1995) discusses the importance of morphological structure in phonology. He argues that some morphological boundaries are invisible to phonology and that phonological processes can apply across them. These processes can include place assimilation, vowel reduction, syncope and a few others. This type of morphology is referred to as non-analytic. For example, the English word *parental*, although it consists of the noun *parent* and the adjectival suffix *-al*, is viewed as non-analytic for at least two reasons. Above all, the stress moves from the initial syllable of *parent* to the second syllable in *parental*. Secondly, the diphthong [eə] in the noun is reduced to schwa in the adjective. Therefore, although we are dealing with a complex morphological structure like *parent#al*, phonology recognizes this item as one domain, that is [pəˈrentəl].

The other type of morphology, in which phonology sees the junctures, is called analytic. In such cases morphemes constitute separate phonological domains. Among other things, Kaye postulates that if certain lexical items cannot conform to the pattern of syllabic structure and violate the governing relations typical of a given system, then their morphological structure is likely to be much more complex than it might appear. In other words, such items belong to the analytic type. A good example of analytic morphology is the English compound [ˈpəʊstskrɪpt] *postscript*. This word, including the cluster [stskr], which is anything but typical of the English phonological system, must be viewed as consisting of two phonological domains: [[pəʊstø][skrɪptø]]. The governing relations and the licensing of empty slots can be represented as follows:

(78)



Above we see two domains. In both the domain-final empty nuclei (N_4) and (N_9) are licensed by parameter. The remaining empty slots, i.e. (N_3), (N_5), (N_6) and (N_8) are sanctioned by the four IO relations. In particular, in the left-hand domain LIO is contracted between (O_4O_3), a relationship licensed by the empty nuclear position (N_4). In the right-hand domain LIO is held between (O_6O_5) and RIO is established between and (O_6O_7). These two IO relations are licensed by the vowel under (N_7). Moreover, another LIO, sanctioned by (N_9), is contracted between (O_9O_8) In terms adopted in the present analysis, the empty slots (N_3), (N_5), (N_6) and (N_8) are all buried.

Another interesting instance of analytic morphology in phonology is the English word *sixths* which, according to Kaye (1995), has the bracketed structure of [[[sɪksø]θø]sø], where the last three members of the final cluster [ksθs] are licensed by parameter as domain-final.

To sum up, a phonological domain is one which includes the regularities of a given phonological system. If an item which belongs to this system violates the commonly occurring regularities, it should be viewed as one composed of more phonological domains than one.[16]

Given this theoretical background, let us now return to the ternary clusters occurring in the middle of Old Irish words. As already mentioned, all the cases in (73) including ternary combinations are morphologically complex. However, the group in (73e) containing typical word-initial sequences, i.e. [χr], [sL] and [sN], preceded by single consonants, which ultimately surface as [θχr], [χsL] and [RsN], cannot be analyzed in terms of regular governing relations proposed for binary consonant combinations. The main problem lies in the licensing of empty positions separating the consonants because no LIO relation, which is the only type of interonset government detected in the system, can be proposed between any of the cluster members in these sequences.

Thus, the only logical solution to accounting for the sequence of empty nuclei separating the cluster members, i.e. [θøχør], [χøsøL] and [RøsøN] is that we are dealing with at least two domains in each case. This is represented below:

[16] A lucid description of phonological domains can also be found in Gussmann (2002).

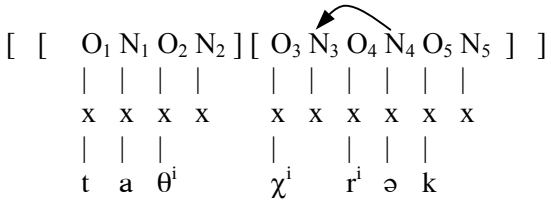
(79)

[[foχø][søLa]]	*:fochsla*	– ‘seize’
[[taθ^{i}ø][χ^{i}ør^{i}əkø]]	*taithchrecc*	– ‘redeeming’
[[kodəRø][søNe]]	*cotarsnae*	– ‘contrary’

Given that these items derive from prehistoric complex structures such as *fo-kom-sel-, *to-ait-kre- and *kom-tarsna, respectively, solutions such as these in (79) seem plausible. It should be emphasized again that all the items in (73) originate from ancestral forms which show morphological complexity, but only the ones in (79) force us to adopt the view that they are not single domains. This is because only these items violate the governing relations detected in the phonological system to which they belong.

Thus, in (79) we can see final empty nuclei licensed as domain-final, which are followed by typical word-initial clusters where the empty nuclei separating the cluster members are properly governed by the following vowels. By way of illustration, consider the following structure:

(80)



Under such an analysis, the muteness of all the empty nuclei can be accounted for. The empty nucleus (N_2) following [θ] is domain-final and thus empty without any consequences. The nucleus (N_3), which separates the cluster [χr] is properly governed by (N_4).

Although the notion of phonological domains is very helpful in explaining otherwise inexplicable consonant combinations, the idea that we should divide words into domains may be frowned upon because of what has been advocated so far. In particular, it has been claimed that in prehistory phonological processes could easily operate across word-boundaries, while here they cannot do so even within words. However, it must be emphasized that ancient consonant mutations do not seem to operate synchronically in Old Irish and, in order to derive e.g. *taithchrecc* from *to-ait-kre-, one has to enumerate prehistoric processes such as the weakening of [t] → [θ] and [k] → [χ], which must have occurred within phonological words, the possible shift of stress to the initial syllable of the noun from the second in the verb *do:aithchrenn* (*to-ait-kren), the vocalic fusion of [o]+[a] → [a], as well as a few minor adjustments. Such a number of

operations must have taken place over a long period of time and it is by all means possible that between the era of phonologically motivated mutations and Old Irish new phonological do-mains replaced the old ones. The fact that triconsonantal combinations surfacing in Old Irish had not been present in the system beforehand seems to support the view that the morphological complexity of Irish words had been changing before Old Irish. In other words, what may have been one phonological domain in Insular Celtic was no longer the same domain in Primitive Irish. On the other hand, the occurrence of empty nuclei in every phonological system must be accounted for on a synchronic basis.

Therefore, at the present state of research, the solution proposed above seems the only possibility of explaining why unusual triconsonantal clusters can surface word-medially in Old Irish and why so many empty nuclear positions can be included in word forms such as those in (79).

3.2.24. Word-final sequences – conclusion

Word-final sequences in Old Irish words are all characterized by falling sonority, i.e. RT. The analysis above indicates that this fact should have no impact on the perception of their phonological structure. Using the notion of phonological licensing, it can be proposed that the seemingly similar clusters can be divided into three groups. The only LIO-clusters are those composed of voiceless stops preceded by either sonorants, e.g. [lk], or voiceless fricatives, e.g. [χt]. It can also be claimed that non-homorganic sonorant+voiced stop sequences, e.g. [rg], should be viewed as spurious clusters which developed svarabhakti vowels very early, i.e. [rəg]. This proposal suggests that the so-called Modern Irish epenthesis was in fact an Old Irish development (it is not unlikely that it was even older). An argument in support of this stance is that the mediaeval poetry did not treat combinations like [rg] as comparable to clusters such as [rk], i.e. [rg] never rhymed with [g], while [rk] could rhyme with [k]. Finally, it has been proposed that homorganic sonorant+voiced stop sequences, e.g. [mb], were simplified to sonorant geminates within or just before Old Irish and it was only then when they established LIO-gemination. It should also be emphasized that the recognition of three types of word-final clusters is helpful in analyzing the structures of many word-medial triconsonantal sequences.

3.3. Chapter summary

The foregoing analysis of Old Irish clusters has sought to demonstrate that the sonority profiles and a priori interpretations of consonant sequences should have no influence on phonological analysis. The important factors are: the licensing capability of nuclei and the element complexity of cluster members. The above

analysis was divided into two main parts: one embraced word-initial, while the other word-final clusters. Word-medial sequences were treated as combinations which occur on either edge of the word.

Consonants in word-initial sequences, which are by and large defined by rising sonority TR, were deemed to display no IO relations between the cluster members. Such a conclusion resulted from a diachronic analysis of lenition phenomena in consonant sequences which indicated that the nuclei in the phonological system of Irish were gradually losing the potential to license rightward interonset relations (RIO). In particular, RIO was first broken-up word-medially in shallow complexity clusters, e.g. [gn], which ultimately led to the decomposition of RIO in the other, previously well-formed RIO structures, e.g. [tr], in all positions in the word. *s*+voiceless stop clusters constitute a conspicuous exception to the absence of government in word-initial position. In these combinations IO government does obtain but it is contracted in the direction typical of word-final sequences (i.e. leftward). Word-medial consonant clusters displaying the same sonority profile, i.e. TR, have been found to conform to the pattern established for word-initial combina-tions. In other words, they contract no IO relations.

Word-final consonant sequences, which invariably display falling sonority, i.e. RT, cannot automatically be viewed as governing relations either. Also here the constantly diminishing licensing power of nuclei can provide the key to interpreting the structure of clusters. It has been shown that leftward interonset relations (LIO) can be contracted only between steep complexity clusters, e.g. [Rt], while all the other combinations must have different structures. A diachronic analysis of the behaviour of word-final clusters, their development after the period of Old Irish, as well as their employment in the mediaeval rhyming patterns, suggest that non-homorganic sonorant+voiced stop sequences, e.g. [rg], should be regarded as epenthetic, i.e. [rəg], while the homorganic sonorant+ voiced stop combinations, e.g. [mb], are in fact tense sonorants in which LIO (gemination) also operates. The reason why these two groups can rhyme in the mediaeval verse has to be sought in prehistory when they displayed identical phonological structures.

Triconsonantal combinations of consonants usually contain the binary clusters occurring at either end of the word. These are either preceded of followed by a single consonant. When typical word-final clusters are combined with a single consonant, the structures of ternary sequences can be explained using the mechanisms employed in determining the structures of the final clusters. When classic word-initial groups stand side by side with one consonant, we need to resort to the notion of morphological boundaries visible to phonology. Specifically, in such cases the presence of two phonological domains must be proposed.

A side-effect of this analysis has been an omnipresent need to distinguish between two types of empty nuclei. Nuclei of the first type, named 'unburied' here, occur word-finally and can be properly governed in word-medial position. These empty slots can be licensers for the preceding onsets and some IO relations. The other kind, referred to as 'buried', are present between true clusters and play no role in phonology. In other words, such nuclei cannot serve as licensers for the onsets they follow. This differentiation has made it possible to define the leniting environment, which has never been presented in a similar fashion in the relevant literature. In traditional analyses the prehistoric contexts of VCV and VCRV are perceived as leniting. Here, however, it has been proposed that the presence of resonants did not contribute to the creation of a leniting environment in ancient times. What mattered was the nature of empty nuclei. In particular, consonants were weakened between a vowel and an unburied empty nucleus, whereas they resisted lenition between a vowel and an empty nucleus buried by an interonset relation. Therefore, unburied empty nuclei behaved like vowels with respect to lenition. Or, to be more precise from the diachronic viewpoint, vowels started to behave like unburied empty nuclei at some point in the prehistory of Irish.